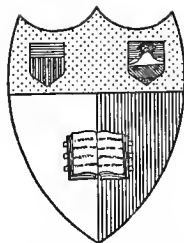


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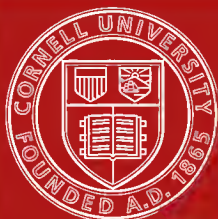
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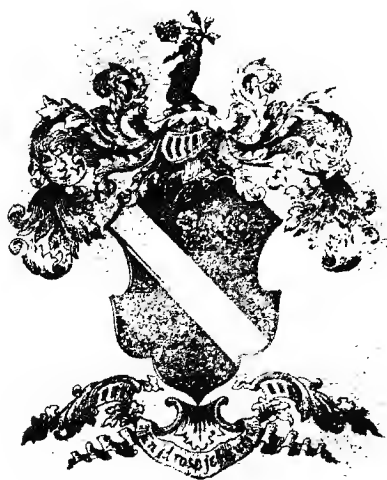
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DAVID
DuBOSE
GAILLARD





DAVID DuBOSE GAILLARD

David DuBose Gaillard

A Memorial

U.S.

COMPILED AND PUBLISHED BY THE THIRD
UNITED STATES VOLUNTEER
ENGINEERS



SAINT LOUIS

1916

U.S.

En

A. 381370

IN LOVING MEMORY OF
OUR REGIMENTAL COMMANDER IN THE SPANISH WAR
AND HIS NOBLE WIFE

THIRD U. S. VOLUNTEER ENGINEERS

Foreword

At the annual meeting of the Third United States Volunteer Engineers held in St. Louis in May, 1914, it was voted to publish a memorial of Col. David DuBose Gaillard, who had been their regimental commander in the Spanish War. The Committee appointed to discharge this task collected, insofar as was possible, the various articles and tributes that had appeared in print following Col. Gaillard's death and received many letters from men who had been associated with Col. Gaillard in his lifetime.

The Committee was fortunate in securing the assistance of Miss Ellen Bates of St. Louis, niece of General John C. Bates, in editing the material secured. The constant aid and advice rendered by Dr. A. E. Bostwick, Public Librarian of St. Louis, from the inception of the undertaking to the reading of the final proof, has been invaluable. The kindly co-operation of Mrs. Gaillard was a very great aid to the Committee at each Stage of the work. The Committee begs to acknowledge the cordial assistance rendered by each of the officers and associates whose contributions appear in the following pages.

E. J. SPENCER
JOHN L. VAN ORNUM
W. J. HARDEE
JOHN A. LAIRD
H. LINTON REBER
J. W. BLACK
LUTHER ELY SMITH

Committee

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DAVID DuBOSE GAILLARD

A Brief Sketch of His Life

. . . “Peace hath her victories
No less renown’d than War” . . .

—*Milton*, “Sonnet to the Lord General Cromwell”

DAVID DuBOSE GAILLARD

That Col. David DuBose Gaillard should have chosen a career in the service of his country is but the logical result of his ancestry. The best traditions America has to give her sons—pride of service and great abilities and success in achievement—were his birthright.

ANCESTRY

Colonel Gaillard comes of distinguished ancestry, both Huguenot and English.

In the records of the family in France we see displayed the same courage and fidelity to lofty ideals that they have shown here.

In the Thirteenth Century the name of one ancestor is found, with other knights of Languedoc, enrolled in the catalogue as "Defenders of the Faith" under Raymond, Comte de Toulouse, against Simon de Montfort, emissary of Pope Honorius.

Froissart gives John Gaillard as at the battle of the Soissons on the Aisne in 1363. In 1616 another Gaillard commanded a ship of the Protestant Party in a battle off the mouth of the Charente. He was taken prisoner, and refusing to recant was conducted to Bordeaux and there "broken on the wheel."

After the Revocation of the Edict of Nantes in 1685 many Huguenots for "conscience sake" fled from France, and among those on the "Liste" we find these two of Colonel Gaillard's ancestors:

"Pierre Gaillard, né a Cherveux en Poitou, fils de Pierre Gaillard et de Jacquette Jolain" and

"Isaac DuBose, de Dieppe en Normandie, fils de Louis DuBose et de sa femme Anne."

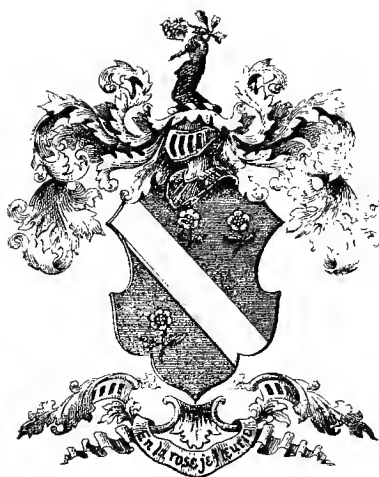
They came in 1686 to the English Province of South Carolina and settled in the Santee Country. To show their allegiance to their new country, they became English subjects; many even translated their names, which soon were to be found amongst the most influential in the Colony.

Three of Colonel Gaillard's ancestors served in Francis Marion's Brigade as officers during the Revolutionary War—his great-great-great-grand-fathers, Gen. Richard Richardson and Capt. Peter Gaillard of the Rocks, and his great-great-grand-father, Samuel DuBose of Santee, who was Marion's adjutant.

Col. Richard Richardson, his great-great-grand-father, a son of Gen. Richard Richardson, served in the regular army.

A collateral ancestor, John Gaillard, was from 1804 to 1826 in the United States Senate. He was five times elected to the Senate, presiding over that body for fourteen years. Nine times he was elected president pro tempore, and three times he filled vacancies caused by the deaths of Gerry and Clinton and the absence of Tompkins. His service terminated only with his death.

Theodore Gaillard, brother of John Gaillard, was educated in England. In 1808 he was made Judge



A. R. Gaillard

THE GAILLARD ARMS

of the Courts of Chancery, General Sessions and Common Pleas, and was Speaker of the House of South Carolina.

Colonel Gaillard was the fifth of his name to enter West Point.*

During the Civil War Colonel Gaillard's father and six uncles gave their services to their State, in the Confederate Cause.†

On his mother's side his ancestry is equally distinguished, going back to the Huguenot emigré, Isaac DuBose, on the paternal side, and to the Richardsons on the maternal.

Gen. Richard Richardson, mentioned above, his great-great-great-grandfather, was an officer under the British in the Colonial service and did such gallant service in the Cherokee wars in 1760-61 that in the *South Carolina Gazette*, Sept. 25, 1762, we

*1. Daniel S. Gaillard, admitted in 1817, married while on leave, and was dropped Feb. 28, 1818.

2. Warren Gaillard, admitted in 1817, graduated in 1821 and died in Pensacola while on duty.

3. Daniel W. Gaillard, admitted in 1817, did not graduate.

4. Peter C. Gaillard, admitted in 1831, graduated in 1835. Resigned in 1838. During Civil War he was Colonel in Confederate Army, serving with conspicuous gallantry at Battery Wagner, Secessionville and at Morris Island, where his left wrist and hand were shattered.

5. David DuBose Gaillard, admitted in 1880, graduated in 1884.

†1. Samuel Gaillard, his father, was Sergeant Major in Hampton's Legion.

2. Richard Gaillard, Captain and Brigade Quartermaster under General Gregg.

3. Alfred Gaillard was Captain 1st S. C. Artillery.

4. Edmund Gaillard, Lieutenant 2nd S. C. under General Kershaw, was mortally wounded at Gettysburg.

5. Isaac Gaillard served in the 6th S. C. under General Bratton.

6. David St. Pierre DuBose, his mother's brother, was a Captain in Hampton's Legion.

read that as a token of gratitude the citizens of St. Mark's Parish (afterward Clarendon, Colonel Gailard's birthplace) presented to him a handsome service of plate.

He was a member of the Provincial Congress and of the Legislative Council in 1775.

He served under Francis Marion, reaching the rank of brigadier general during the Revolution, leading many successful expeditions against the Tories and British. In the latter part of the war he was taken prisoner and carried to Charleston. His influence was so great that Lord Cornwallis, fearing his opposition, proposed to him in the presence of his friends and family that he either unite himself to the Royal Standard with *carte blanche* as to titles, offices and other gifts of the Crown, or submit to the alternative of close confinement. His reply is authentically reported to have been:

"I have from the best convictions of my mind embarked in a cause which I consider righteous and just. I have knowingly and willingly staked my life, family and property on the issue. I am well prepared to suffer or to triumph with it, but I would prefer a thousand deaths rather than to betray my country or to deceive my friends."

The threatened alternative was rigorously enforced, until with shattered health and death very near, he was allowed to return home to die. After interment the British General Tarleton had his body exhumed, his pretext being that he wished to examine the face of a man of so determined a character.

His son, Richard Richardson, was in 1776 made a captain in the Regular Army, serving under Col.

Thomas Sumter, and was promoted to a colonelcy later for "meritorious service." Colonel Richardson's wife, Dorcas Neilson Richardson, Colonel Gaillard's great-great-grandmother, was noted for her fearless bravery and patriotism, and is mentioned among Mrs. Ellet's "Noted Women of the Revolution." Among their descendants have been three Governors Richardson and three Governors Manning of South Carolina.

This was the ancestry of "Gaillard of Culebra," this inheritance of bravery, physical and moral, lofty ideals, with an unswerving devotion to duty, whether it lay on the winning or losing side.

BOYHOOD

David DuBose Gaillard, son of Samuel Isaac and Susan Richardson DuBose Gaillard, was born at Fulton P. O., Sumter County, South Carolina, the summer home of his parents, September 4, 1859.

Until 1872, with his parents and sisters, he lived with his grandfather, David St. Pierre DuBose, at his home in Clarendon. The fine character and high ideals of his grandfather served as an inspiration to him, and he ever held his memory dear, naming his only son "David St. Pierre," in his honor.

The school there being very poor, in 1872 he left Clarendon and went to Winnsboro, Fairfield County, where he lived with his grandmother, Mrs. David Gaillard, and for three years attended Mount Zion institute. But his family, like many others, had lost their all for their loyalty to the Lost Cause, and in that pitiful struggle with poverty, which those early years of '70 brought to the Southern people,

it became necessary for him to do something for himself.

His high sense of duty, already developed, impelled him to accept whatever he could get, which was a position as clerk in the general store of Fleming McMaster.

There early and late he worked, doing whatever there was to be done, always with the same accuracy, zeal, light-heartedness and efficiency which he has shown in his later achievements.

One of the leading public men in South Carolina at that time was R. Means Davis (who was in later years to become Colonel Gaillard's brother-in-law). A lawyer by profession, his interest in restoring educational advantages to the children of the stricken state was so great that he accepted the position of principal of Mt. Zion Institute in Winnsboro. He knew and was deeply interested in young Gaillard's struggles and ambitions.

Professor Davis's younger brother, Henry, now Col. H. C. Davis, Artillery Corps, U. S. A., in 1878 had successfully passed the examinations to West Point. The following year, learning of a competitive examination that was to be held for a West Point vacancy from the Congressional district of Hon. J. S. Richardson (Sumter), Professor Davis strongly advised young Gaillard to try for the appointment. The boy, needing no urging, gladly took out his neglected but not forgotten books.

His mind was brilliant, taking in knowledge "in the whole" and seemingly already assimilated, so that when the examination was held under Professor Leland, a West Pointer, and one-time professor at the Charleston, S. C., Citadel, he easily won.

Soon a cloud appeared on the horizon of his hopes, for someone had raised the question of his eligibility for appointment from Sumter, since he lived in Fairfield.

This question was taken up by the law firm of H. A. Gaillard and R. Means Davis. They wrote to Colonel Richardson, who had cancelled the appointment, but he was not convinced. Then R. Means Davis wrote to Robert T. Lincoln, Secretary of War, and immediately came the reply that the minor son takes the residence of the father. Convinced, Colonel Richardson renewed the appointment and young Gaillard left the store and went seriously to work on his studies. His old-time friend, Prof. R. Means Davis, now principal of Mount Zion, assisted him in every way, even letting him teach some of the classes, laughingly saying there was no better way of studying geography and history than by teaching them. One of his classes was "B" third, made up of all the incorrigibles and ineligible of "A" third.

Later he left Winnsboro, and with money saved from his slender salary as a clerk, he entered a preparatory school near West Point, at Highland Falls. These two young men from South Carolina, Davis and Gaillard, were among the first native Southerners to enter West Point after the Civil War.

Gaillard successfully passed the entrance examinations at West Point, and entered as cadet in September, 1880, although handicapped by lack of preparation. Nevertheless, he was graduated No. 5 in a class of 31, which is said to have been one of the most brilliant classes ever graduated from the Point.

Gaillard, who was tall and slender, and his roommate, W. L. Sibert of Alabama, who was a giant, were known by their classmates as "David and Goliath." His own forename thus became also a very appropriate nickname. "David" and "Goliath" met later in Panama, as members of the Commission.

OFFICER IN THE CORPS OF ENGINEERS

Gaillard was commissioned Second Lieutenant of Engineers on September 15, 1884.

His first duty as a commissioned officer was in the Service School of Engineering at Willets Point, N. Y., graduating in 1887. From the Engineering School he was sent to Florida on river and harbor work, and then, but seven years out of West Point, he was appointed a member of the International Commission for the establishment of the boundary between the United States and Mexico.

In 1887 he was married to Miss Katherine Ross Davis of Columbia, South Carolina, sister of Prof. R. Means Davis, the friend and adviser who had been so potent in shaping his career for West Point and the Army. A son, David St. Pierre Gaillard, now an electrical engineer, was born January 25, 1890.

A brief return to regular duty in connection with the defenses of Fortress Monroe was followed by an assignment in charge of the Washington Aqueduct and local water supply of the City of Washington. The Department of State, mindful of the young engineer's Mexican work, again borrowed him for service, this time in Alaska, upon the survey of the Portland Channel, a mission of international significance.

COMMANDER IN THE SPANISH-AMERICAN WAR

When the Spanish-American War began in 1898, Colonel Gaillard, then a Captain of Engineers, at the request of General James F. Wade, was assigned April 28 to duty as Chief Engineer on his staff. At that time it was thought that General Wade would lead the expeditionary forces to Cuba. A different plan, however, was finally adopted, and General Shafter was placed in command of the expedition. Captain Gaillard was with the forces at Tampa during those trying days of uncertainty, when the troops were embarking one day, in anticipation of immediate sailing, and disembarking the next, until, on June 7, 1898, he was appointed Colonel of the Third Regiment of United States Volunteer Engineers. Four days later he accepted the appointment and immediately began the difficult task of securing officers and men of the requisite skill and ability for a regiment of this character. So well were his plans laid that barely a month elapsed before the regiment, whose members were recruited largely from the South, was mustered into service at Jefferson Barracks, Missouri. After several weeks of active military and engineering training at various camps in the United States, the regiment was sent to Cuba with the army of occupation. One battalion went to each of the cities of Cienfuegos, Pinar del Rio and Matanzas, and rendered services of a high order in a great variety of engineering fields, civil, mechanical, sanitary and hydraulic. Returning to the United States via Savannah, the regiment was mustered out at Fort McPherson, Ga., May 17, 1899.

The regiment possesses a very unusual record. The standard achieved by the commanding officer in developing this body of men is indicated by Gen. J. C. Bates, who in 1905 wrote to Colonel Gaillard, "As Colonel of the Third Engineers, United States Volunteers, you commanded, if not *the best*, one of the best regiments I have ever known." More at length, Gen. James H. Wilson comments as follows: "The regiment was made up of fine officers, many of whom were well educated and experienced civil engineers, and of capable non-commissioned officers and men from similar callings in civil life. Under Colonel Gaillard the regiment soon took shape as one of the best in discipline, soldierly behavior and efficiency in the army. It served at Jefferson Barracks, Mo., Lexington, Ky., at Macon, Ga., and afterwards in the Departments of Matanzas, Santa Clara and Pinar del Rio, Cuba, for nearly a year, during the whole of which time it rose steadily in the esteem of its commanding officers as a model of what an American Regiment should be. It rendered most valuable service at all times in surveys, scientific investigations, in local explorations and sanitary work at Matanzas, Cardenas, Colon, Villa Clara, Cienfuegos and Pinar del Rio for the lasting benefit of the nascent Cuban Republic.

"The behavior of this regiment and its officers was a constant example for the admiration and the emulation of the Cubans and to the credit of the intervening Government. It was absolutely free from rowdiness, drunkenness and the rude assumption of authority, which too frequently characterized the behavior of other regiments. It at no time assumed an attitude of domination or superiority,

but whether in camp, on the march or on leave, always behaved toward the Cubans as though it regarded them as friendly allies and in no sense as alien or hostile people. The force and benefit of this behavior can be fully appreciated when it is recalled that the Central Department of Matanzas and Santa Clara was not only the first to become thoroughly pacified, but remained so till the new Republic was organized, and that no influence did more to bring about this desirable and satisfactory condition of affairs than the worthy example of the Third U. S. Volunteer Engineers and its masterful and accomplished Colonel. It is the training and character imparted to such regiments by the West Point education and discipline that make them so creditable to our civilization at large and point so clearly to the true means of organizing a national reserve and of utilizing the military strength of the country in case of actual need.

“While the foreign service of this admirable regiment lasted less than a year, it will be a matter of pride to both its officers and men all their lives.”

FURTHER ENGINEER WORK—“WAVE ACTION”

After the regiment was mustered out, Colonel Gaillard served for a time as assistant to the Engineer Commissioner of the District of Columbia, and in 1901 was placed in charge of river and harbor improvements on Lake Superior.

To this period belongs his research into the aspect of “Wave Action Upon Engineering Structures.” Gen. James H. Wilson says of this work:

“Later, when stationed at Duluth, in charge of

river and harbor works in that region, he threw himself, heart and soul, into the questions before him, and soon found himself confronted with practical and scientific questions affecting the stability of engineer structures exposed to 'wave action,' that had never been satisfactorily solved.

"With characteristic determination and thoroughness he set about the investigation of wave action and the theories applicable thereto. He soon discovered that the investigations of his predecessors in that field had been far from exhaustive; that too much attention had been paid to deep-water waves and not enough to the effects of shallow waves; that the books in the reference libraries were confined in most cases to special questions or to particular phases of wave action, or were so widely scattered as to be practically inaccessible or far too complicated for working engineers.

"While the author claims but little credit for the mathematical treatment of the subject, the work simplifies the whole method of procedure and constitutes a distinct step forward. It is recognized by the profession everywhere as of the highest value in this complex branch of engineering. But this is not all. In his original investigations, Colonel Gaillard not only works out step by step the proper mathematical deductions, but also devised the original diaphragm dynamometer with gauges and clockwork mechanism which enabled him to make correct observations of wave action in all situations, and to record the same with certainty and precision.

"He finished his work upon this subject while stationed at Vancouver Barracks in 1903, and early in 1905 it was approved by the Chief of Engineers

and printed for the use of engineer officers. It is a monument to his mathematical talents and his ability as an engineer.”

ON THE GENERAL STAFF

When the General Staff of the Army was established, Colonel Gaillard was detailed to that body and served successively in the Department of the Columbia, in the Northern Division, in the Army War College, and as Assistant Chief of Staff and Chief of Military Information Division in the second occupation of Cuba.

AT PANAMA

In 1907 the task of digging the Panama Canal was turned over to the Army. On March 22, Colonel Gaillard was appointed a member of the Isthmian Canal Commission. He served as supervisory engineer in charge of dredging harbors, of building the necessary breakwaters and all excavations in the Canal prism, except that incidental to lock and dam construction, April, 1907, to June, 1908; and as Division Engineer of the Central Division, including the famous Culebra Cut (now Gaillard Cut), from July, 1908, to the date of his death. A more extended account of his work on the Isthmus has been prepared by Col. Edgar Jadwin for this memoir, and will be found on pages 23-38, under the heading, “Gaillard as an Engineer.”

Upon their arrival on the Isthmus in 1907, Colonel and Mrs. Gaillard at once established their home at Culebra, in the Canal Zone, and adapted themselves to their new environment. Mr. Edward B. Clark (a

classmate of Colonel Gaillard at West Point), writing in *The St. Louis Times*, October 6, 1913, during Colonel Gaillard's illness, thus described their home:

“On the hill at Culebra stands the residence of Lieut.-Col. David DuB. Gaillard, the landslide conqueror and the digger of the great Culebra Cut. The jungle had been cut away when the engineer's quarters were built. The place was as bare as the peak of an Arctic mountain. Under the directing care and the fine perception of Mrs. Gaillard, their home in a season or two was embowered in tropical growth, with a softened color scheme which I have never seen equaled.”

The world-wide interest in the great work attracted many visitors to the Isthmus. Engineers, artists, public officials, travelers from home and abroad, under Colonel Gaillard's trained and kindly guidance, when his official and professional duties would permit, saw and understood the stupendous miracles that were slowly and surely being wrought on the Isthmus. Mrs. Gaillard was a charming hostess and many were the visitors who enjoyed the hospitality generously offered at their home; and the circle of their friends, thus widened, brought back to them a constant stream of delightful messages.

ILLNESS AND DEATH

Colonel Gaillard came to the United States in May, 1913, for a short vacation. He returned to Panama, sailing on the 26th of June, arriving there on July 2d. He finished his annual report and at-

tended to other matters relating to Canal work. His health, however, had begun to fail, and within the month he suffered a nervous breakdown. On July 15, Mrs. Gaillard, who had just arrived in Panama from the States, noticed that he was quite ill, and on July 26 he went into Ancon Hospital. On August 8, with Mrs. Gaillard, his son, Pierre, and Dr. Charles Mason, Colonel Gaillard sailed for the United States. The party arrived at New York on August 16 and went at once to the Henry Phipps Clinic of the Johns Hopkins Hospital in Baltimore. The physician there diagnosing an intercranial growth, he went September 1 to the Peter Bent Brigham Hospital in Boston, where Doctor Harvey Cushing operated, but with no beneficial results. He returned to the Johns Hopkins Hospital October 1, and after three months of total unconsciousness, died there, December 5, 1913.

GAILLARD AS AN ENGINEER

By Edgar Jadwin, Lieutenant-Colonel, Corps of Engineers, U. S. A.

[Late Major and Lieutenant Colonel Third U. S. Volunteer Engineers; Division Engineer, Chagres Division (1907-1908), under Colonel Gaillard in the Department of Excavation and Dredging; Resident Engineer, Atlantic Division (1908-1911), under Col. W. L. Sibert, in charge of Dredging and Shops, Design and Construction of Colon Breakwater, and (1910-1911) quarrying and transporting rock and sand for Gatun Locks.]

GAILLARD AS AN ENGINEER

Colonel Gaillard received the education and training usual for an engineer officer of the Army. After graduation from West Point, in the Class of 1884, and assignment to the Corps of Engineers, he took the post-graduate course at the Engineer School of Application with credit.

From then until he reported in Panama, his experience was unusually varied. Part was on river and harbor work, some on the Atlantic Coast in Florida and some on the Great Lakes at Duluth, a tour in charge of the Washington Aqueduct which carries the water supply for the City of Washington and District of Columbia, a reconnaissance and survey on the boundary between Alaska and British Columbia, and still another tour as a member of the commission establishing the western half of the boundary between Mexico and the United States. At the outbreak of the Spanish War, he was selected for duty first as an engineer officer on the staff of a Corps Commander, and later as the Colonel of our beloved regiment where, as we all know, his work was of the highest possible order. His river and harbor work was likewise of the best. In connection with the latter he made time to conduct a series of original experiments concerning wave motion and

wrote what is now the standard technical work on that intricate subject.

While having a reasonable amount of the river and harbor work which forms so large a part of the experience of most officers of his age, he was, on account of exceptional fitness, selected for many special details. In addition to his high character, general ability and indefatigable industry, which were combined with a sunny geniality and a joyous sense of humor, he was possessed of a most unusual power of accurate observation. These qualities made him especially valuable for work along untrodden paths. His experience on all these lines developed his natural traits and produced a man peculiarly adapted for the Isthmian work.

Upon the resignation of Mr. John F. Stevens, President Roosevelt placed the control of the Panama Canal work in the Army Engineers, appointing Lieut.-Col. George W. Goethals, Maj. D. D. Gaillard, later Lieutenant-Colonel, and Maj. W. L. Sibert, now Lieutenant Colonel, as members of the Isthmian Canal Commission. Upon assuming control, Colonel Goethals divided the main construction work into two departments, one, the Department of Dredging and Excavation which was placed in charge of Lieutenant Colonel Gaillard, and the other that of Locks and Dams, placed in charge of Lieutenant-Colonel Sibert, a former class-mate and room-mate at West Point and a close friend of Colonel Gaillard. The Department of Dredging and Excavation comprised two dredging divisions and one dry excavation division. The Pacific Dredging Division handled the work at the south end of the canal, from the Pacific Locks to the Pacific Ocean; the Colon Division, that from

the Gatun Locks to the Atlantic Ocean; and the Culebra Division the dry excavation work through the nine miles constituting the backbone of the continent. There was at the time no work being done along the twenty-three miles from Gamboa to Gatun where the course of the Chagres River coincides with that of the canal. Colonel Gaillard immediately planned for the commencement of work on this stretch and arranged for the detail of the writer, who had been junior Lieutenant-Colonel in the 3rd U. S. Volunteer Engineers, as Division Engineer of the new organization to be known as the Chagres Division.

One of the first things the writer heard on the Isthmus was a discussion by Colonel Gaillard of the high costs of excavation on the canal and a statement of his desire to reduce them. He referred to the opinion held by some that the French machinery was of little value. With his quick perception and keen observation he had seen that this sentiment might go too far and that if practicable, greater use should be made of the French machinery. He pointed out the great quantity of excavation which had been done by the French, 24,000,000 cubic yards in Culebra Cut alone, according to French records. M. Bunau-Varilla gives the total excavation in any one month on the canal under the French as 1,424,000 cubic yards in January, 1886. These quantities seem larger even now when one recalls how deficient the French sanitary system must have been compared to the one which was organized and maintained by General Gorgas and which rendered our continuity of effort possible.

Colonel Gaillard suggested that the Chagres Division would afford a field in which work could be start-

ed more quickly by making use of the French machinery than by waiting for the acquisition of new machinery, and that sufficiently low costs of excavation per cubic yard could probably be obtained to justify such a line of action. When the situation was developed his ideas on the subject were found to have been correct. While practicable to secure for the excavation a dozen American steam shovels, only three modern locomotives could be obtained. Most of the hauling was therefore done by forty-six old French locomotives. A large percentage of the equipment also consisted of old French cars.

Nevertheless, in six months from the time work was started the cost per cubic yard of excavation on this division was less than on the Culebra Division, where the more modern plant had long been in use. While many elements of course contributed to this result the fact remains conspicuous that Colonel Gaillard had promptly recognized the key of the situation. It seems more than appropriate that so substantial a tribute to the value of the French work as well as the essential triumph over Culebra Cut should be directed by an American with French blood in his veins.

On July 1, 1908, Colonel Goethals effected a general re-organization of the force by which the departments were abolished, the small divisions consolidated and the construction work re-divided into three general geographical divisions, one comprising the Atlantic Locks and the work north of them with Colonel Sibert as Division Engineer, another the Pacific Locks and the work south of them with Mr. Sidney B. Williamson (at one time a Captain in the 3rd U.S. Volunteer Engineers) as Division Engineer,

and the third the excavation work between the Atlantic and Pacific locks. This was called the Central Division and Colonel Gaillard was appointed its Division Engineer. The writer was at that time transferred to the Atlantic Division under Colonel Sibert's orders and placed in charge of the dredging and shops constituting the old Colon Division, in addition to the design and construction of the Colon breakwater, and still later of the supply of sand and stone for the Gatun Locks. Enough was seen of Colonel Gaillard's work, however, to know that he was indefatigable in his efforts to secure the best possible results, that while ever just and considerate of those working for him, he gave the closest attention to every detail of his work and was continually engaged in analysis of the cost of one or another of the items of his work and the development of some improvement in plan or service.

An incident indicating his close personal observation may not be inappropriate. The question was raised whether certain rock would stand or disintegrate if used as a covering for part of the Gatun Dam, and Major Hoffman in charge of the Gatun Dam work under Colonel Sibert had been making an investigation. A year later Major Hoffman stated that although he had asked many men he had secured very little positive information until he asked Colonel Gaillard. He was much impressed by the fact that the latter at once directed his attention to shovel marks on the rock of an old tunnel made by the French as possibly the best evidence to be obtained on the Isthmus of the effect of the weather upon rock of the character in question.

As previously indicated, this faculty of close ob-

servance and analysis made Colonel Gaillard pre-eminently the man for cutting the backbone of the continent. The work was making good progress when he took hold of it and therefore there was no room for the development of many new engineering principles. The main problems rather resulted from the magnitude of the work. The great service to be rendered was to advance and accomplish it more rapidly and more cheaply. No man in the United States could have done this better than Colonel Gaillard.

The central division extended from Pedro Miguel Locks to Gatun Dam and Locks, a distance of thirty-three miles, and embraced the entire summit level of the Panama Canal. The Culebra Cut embraced the greater part of the dry excavation in the Division and is nine miles in length, of which a little over seven and one-half miles has a bottom width of three hundred feet and a depth of forty-five feet. The remainder of the canal has a width in excess of three hundred feet.

The engineering problems connected with the work of the division were handled by the engineering force, under a resident engineer. In addition, there was a superintendent of transportation, who handled all transportation matters, and a superintendent of the water and air service, who kept all shovels, drills, pumps, etc., connected with water and air mains. The work involved may be inferred from the fact that over 1,000 loaded and empty trains have been handled in the Central Division in a nine-hour day, and an average of two miles of water and air pipe were laid and two miles taken up for every working day in the year.

The maximum monthly output under American

management in the Central Division before Colonel Gaillard assumed charge was 815,270 cubic yards; the figures in March, 1909, were 2,054,088 cubic yards—an increase of 152 per cent. The greatest number of shovels in use at one time in the Culebra Cut alone was 43.

To handle this amount of material required the services of 115 locomotives and 2,000 cars, giving about 160 loaded trains per day to the dumps, which on the average were about twelve miles distant; the haul one way varying, however, from about one to thirty-three miles. To serve properly the trains and shovels employed in excavation work in the cut, although the latter is less than nine miles in length, about 100 miles of track were required, or an average of over nine parallel tracks at all points of the cut. Reductions in transportation expense were made by improving tracks, decreasing grades, increasing the number of cars in a train, and by improvements in organization. He replaced the old system under which trains generally waited at shovels until loaded, by a new one under which the trains while in motion were partially loaded as they passed the various shovels and stopped to have their load completed at the last shovel on the line. Whereas under the old system the slowest shovel sometimes determined the rate for all, under the new system the trains were kept as much as possible with the shovels which were ready to give the largest output, whether as a result of being in best condition, best operated, or working in the best material. When he took the work, a part of the transportation system considered very important was a large yard near Las Cascadas, to which a large part of the loaded

cars were hauled from the cut and later to the dumps. Empties were similarly treated. After a careful analysis of the operation of the yard he concluded that while such a yard undoubtedly had its place in a large transportation system handling miscellaneous freight for many destinations, its net result where the principal commodity was excavated material was to delay rather than to accelerate the work. It was soon eliminated and trains went through from the shovel to the dump.

The maximum number of drills in use at any time in the Culebra Cut was 377, of which 221 were tripod drills and 156 were well drills. With these drills, an aggregate of over 90 miles of holes have been drilled in a single month.

In the earlier stages of the work, accidents resulting from the use of dynamite were unfortunately not uncommon, and one of the first steps taken under Colonel Gaillard's management was to require a strict inspection of the handling of dynamite and the loading and firing of holes. In spite of every precaution, it was found impossible to avoid a considerable number of miss-fires, and a study was made, with the assistance of the electrical and mechanical engineer, with a view of endeavoring to locate definitely the cause of these miss-fires.

As a result of a long series of experiments, it was conclusively shown that by far the greater number of miss-fires were due to the fact that the holes had been wired "in series." When the fuses were connected "in parallel" and fired by means of the ordinary electric light current, not a single failure of a fuse was noted in a test comprising several hundred fuses.

The results of this investigation were so convincing that all holes were later wired "in parallel" and miss-fires were almost wholly eliminated, although it is scarcely necessary to state that accidents from individual carelessness, from flying stones, or from other causes, will always occur in the extensive use of dynamite, no matter what precautions may be adopted. It is, however, indicative of the efficiency obtained to state that although during three and a quarter years, in work under Colonel Gaillard's charge, over 20,000,000 pounds of dynamite were used in blasting, only eight men were killed, three of whom failed to go to a safe distance and were killed by flying stones, and two by miscounting the number of shots which had gone off in a "dobe" group, and approaching the group before the last shot had exploded.

The amount of dynamite in tons of 2240 pounds in the Central Division for the months of August, September, and October, for the years, 1908, 1909, and 1910, was as follows:

1908.....	974
1909.....	953
1910.....	543

The amount of rock excavated during the same period was:

1908.....	2,977,415
1909.....	3,347,301
1910.....	3,369,064

From this it will be seen that only 56 per cent as much dynamite was used in 1910 as for the same months in 1908, and 57 per cent as much as was used for the same months in 1909. The amount required

was latterly reduced to one pound of dynamite to about every two and a quarter yards of material blasted.

The total saving in cost of dynamite for August, September, and October, 1910, as compared with corresponding months in 1908, was 431.03 tons (2240 lbs.) which amounted in value to \$115,939.00. Besides the first cost of the dynamite there was also the saving in the cost of handling, loading, and shooting.

Much has been heard of the Panama slides. During the early stages of the work by the United States, there was but little movement of material into the canal from outside of the prism, and when such movement began, it was due almost entirely to slides caused by the slipping of the top layer of clay or earth upon a smooth sloping surface of some harder material, the layer of slipping clay in such cases varying in thickness from 10 to 40 feet.

The largest slide of this character is the Cucaracha slide on the east bank of the canal, just south of Gold Hill, which embraced a total area of over forty-seven acres. This slide extends up the bank for a distance of some 1,900 feet from the axis of the canal, and originally had an approximate slope of about one vertical to seven horizontal. It first began to give serious trouble in the fall of 1907, and moved completely across the canal, the toe of the slide advancing for the first ten days at a uniform rate of about 14 feet in twenty-four hours. All tracks in its path were covered or destroyed by its resistless motion, and the moving material actually rose up on the west bank to a height of about 30 feet. Its movement was singularly like that of a glacier. It was, in fact, a tropical glacier—of mud instead of ice—and stakes

aligned on its moving surface and checked every 24 hours by triangulation, showed a movement which Colonel Gaillard stated to be in every respect similar to stakes on moving glaciers in Alaska upon which he had made observations in 1896.

As the depth of the cut increased and the lateral support formerly afforded by the excavated material was removed, the great pressure of the superincumbent banks caused the crushing and squeezing out of underlying layers of soft material, with a breaking, shearing and settling of the high banks and a corresponding elevation or "humping" of the bottom. In later years, slides or breaks of this character greatly exceeded those of the type represented by the Cucaracha slide. The largest slide of this last type is on the west bank of the canal at Culebra, and covered an area of 75 acres. Up to October 1st, 1912, over 7,500,000 cubic yards of material had been removed from this slide and fully 2,000,000 cubic yards then remained to be removed.

As the result of several years experience, slides and breaks were handled with less inconvenience and interruption to other work than was the case in the earlier stages of operation. Yet, notwithstanding increased efficiency in handling them, they caused continual annoyance and interruption to work, and decreased the output and complicated the engineering problem; and while they presented no insurmountable obstacles to the completion of the work in the Culebra Cut, yet they were ever present sources of annoyance, hindrance and expense. Their effects were especially felt in the destruction, displacement or covering up of tracks, interference with drainage and air and water mains, requiring

large gangs to be kept continually at work in their vicinity.

A conservative estimate indicates that within the 8.8 miles of the Culebra Cut, fully 200 miles of track have been destroyed, covered up or have had to be built, solely on account of slides; and in one locality for nearly two years tracks had to be maintained on material moving at a rate varying from one or two inches to several feet per day, necessitating the constant presence of a track gang in order to permit the uninterrupted passage of trains.

It will be seen from what precedes that when the Culebra Cut shall have been completed, not less than 22 per cent of all material excavated by the United States will have been removed on account of slides, and that they will have added twenty-one or twenty-two million cubic yards to the amount of material to be excavated.

During the period from April 12, 1907, to June 1, 1913, the total amount of material excavated under the direct supervision of Colonel Gaillard aggregated 104,800,873 cubic yards;—about half the total amount of excavation (212,504,138) estimated as necessary to complete the entire canal. Of this amount over 88,000,000 cubic yards have been excavated from the great Culebra Cut, including nearly 19,000,000 cubic yards removed from the unprecedented slides which did so much to complicate and increase the difficulties of the work.

In addition to the above, 5,419,751 cubic yards of rock were supplied and hauled to Gatun, a distance of over 30 miles, for use in the construction of the Gatun Dam.

For constructing the road-bed of the relocated

Panama Railroad 4,471,187 cubic yards of material were furnished and hauled an average distance of about 8 miles, and 151,580 cubic yards of hard rock were hauled from the Culebra Cut to the Mole at Colon, a distance of 35 miles.

A dike to divert the currents from the approach channel dredged by the Pacific Division to the Balboa Docks, has been constructed from the mainland to Naos Island across a part of Panama Bay. This dike is 3.26 miles in length and contains 1,121,233 cubic yards of rock.

For use on the dam at Miraflores, and in making the back fill for the Pedro Miguel Lock, the Pacific Division was furnished with 175,125 cubic yards of material from Culebra Cut. To assist the Pacific Division in expediting the work being done on the Miraflores spillway 45,695 cubic yards of material were excavated there by the Central Division.

The money value of Colonel Gaillard's work to the Government of the United States may be best realized from the record of the cost of excavation in the Central Division, which includes the great Culebra Cut, and of which he took charge on April 12, 1907.

Exclusive of General and Administrative Expense above the division, and plant arbitrary, the division costs of excavation were as follows: 1908, 71 cents; 1909, 55 cents; 1910, 54 cents; 1911, 49 cents; 1912, 47 cents.

The annual excavation has been in the neighborhood of 17,000,000 cubic yards. A saving of one cent per cubic yard means, therefore, for the year, a saving of \$170,000.00 to the Government. Had the 1912 excavation cost the same as that of 1910 per cubic

yard, the expenditure would have been increased by \$1,190,000 for the year. The conditions were essentially the same, and the saving can be attributed to excellent management of every detail that affects cost.

While this great work of Colonel Gaillard's resulted in marked saving to the Government it was followed by a nervous breakdown on the eve of the completion of his work.

The financial value of his work, however, is as nothing compared with the moral value of his clean life and the far-reaching influence for right living, thinking and working which has been impressed on so many men. He gave himself completely to his work and has left a record with a ring which must appeal peculiarly to members of his beloved regiment, to his devoted family, his class, his Alma Mater, the Corps of which he was an honored member, the Army, the country, to all real men, and to a just and omniscient God. (May, 1914.)

CULEBRA CUT

(Now “Gaillard Cut”)

(Extracts from articles and papers.)

CULEBRA CUT

The magnitude of the task of digging through the backbone of the Continent at Culebra was more thoroughly appreciated by engineers and scientists than by the general public and press, who impatiently insisted upon "seeing the dirt fly." A few of the many critical descriptions that have been written of the work at Culebra are given herewith:

(From '84 Class Bulletin, West Point, July 1, 1914.)

Culebra Cut was the third gigantic job for the engineering genius of the canal builders and the big man on it was Col. D. D. Gaillard. This piece of excavation alone cost more than eighty million dollars; for over a hundred million cubic yards of digging was required. Much of this was excavation through solid rock. A railroad would have tunneled through it, but the canal had to have an open cut nearly nine miles long through a mountain range.

The spectacle of six thousand men in Culebra Cut operating forty-four steam shovels at one time and sending out one hundred and seventy-five trainloads of debris in a single day attracted engineering experts from Europe and even from Japan. Without exception this great organization of Gaillard's was the most perfect ever seen where so much machinery and so many men were involved.

The cut is three hundred feet wide at the bottom and averages one hundred and twenty feet in depth. The task of excavation was vastly increased when the sides began to cave in. To the average reader of newspaper cablegrams these "slides" were merely loose dirt slipping down the embankment; but the figures of two out of twenty-five slides will give a more accurate conception. In one slide on the western bank seventy-five acres of earth glided off into the canal prism, and on the eastern bank fifty acres did the same thing. Before these two slides occurred Culebra Cut was eight hundred and forty feet wide at the top at this point; after the slides it was two thousand feet wide.

(From "Battling With the Panama Slides," by William Joseph Showalter, in *The National Geographic Magazine* for February, 1914.)

The weapons used by Nature in her efforts to confound the plans of the canal engineers have been slides and breaks in the banks of the canal, and effective weapons indeed have they proven. How, with them, she has stood between the canal army and the completion of the task to which it addressed itself, constitutes the most thrilling episode in the history of canal engineering.

Over two hundred and fifty acres of ground lying outside of the intended banks of the canal, and containing over thirty million cubic yards of material, have swept, with silent but terrific force, down into the canal. Now this onslaught has demoralized an entire railroad system; now it has put the compressed air and water systems out of commission; now it has bottled up one end of Culebra

Cut with an avalanche of debris; now it has imprisoned dirt trains and wrecked steam shovels. But with all the wreck and ruin and chaos there have been men with wills of iron who have met each new situation with a new spirit of determination; men who have never permitted any catastrophe to turn them aside from their ultimate purpose; men whose achievements in the face of unprecedented difficulties make a story as inspiring as anything in human history.

No one who failed to visit the Isthmus during the construction period can understand the full import of the coming of these slides into Culebra Cut. With each passing year they have renewed and redoubled their attacks on the canal plans. They seem to be maneuvered by the hand of some great marshal and sent forth to the fray in every way calculated to put the canal engineers to discomfiture.

Now they are quiescent, attempting to lull the engineers into a false security; now they make a feint, stopping short of an actual conflict; now they come in the dead of night, spreading chaos and disrupting everything in whatever direction they move; now they set up the appearance of being rendered thoroughly harmless by allowing dikes of basalt to peep out, which seem to tie them to the bowels of the earth, only to destroy the hopes which these dikes arouse in the hearts of the besiegers, by shearing them off as if they were but pipe stems, and then flowing, unrestrained, into the cut. . . .

It is no wonder that the lamented Colonel Gaillard lost his health and his life fighting them.

(From "The Panama Gateway," by Joseph Bucklin Bishop, Secretary of the Isthmian Canal Commission.)

No one could say when the sun went down at night what the condition of the Cut would be when the sun rose the next morning. The work of months and years might be blotted out by an avalanche of earth or the toppling over of a small mountain of rock. It was a task to try men's souls, and it was one also to kindle in them a joy of combat which no repulse could chill, and a buoyant faith of ultimate victory which nothing could shake. From all quarters of the globe came engineers and others engaged in construction operations to view the struggle. They came in doubt often as to the outcome, but they went away with all doubt removed. * * * They were not surprised, after witnessing this wonderful human machine at work, that slide after slide went into the Cut without causing the faintest shadow of uneasiness to anyone concerned and without delaying the final completion of the task.

(From "South America" (1912), by James Bryce, author of "The American Commonwealth," British Ambassador at Washington, 1907-1914 (now Viscount Bryce). Upon the completion of a period of seven years as Ambassador at Washington, Lord Bryce visited the Panama Canal and South America, embodying his observations in the volume named above.)

In these forty miles of canal (or fifty if we reckon from deep water to deep water), the two most remarkable pieces of engineering work are the gigantic dam (with its locks) at Gatun, and the gigantic cutting at Culebra, each the hugest of its kind that the world has to show. . . .

The great Culebra Cut is interesting not only to the engineer but also to the geologist, as being what he calls a Section. It is the deepest open cutting

anywhere in the world, and shows curious phenomena in the injection of igneous rocks, apparently very recent, among the loose sedimentary beds, chiefly clays and soft sandstones of the latest tertiary epoch. A troublesome result, partly of this intermixture, and partly of the friability and instability not only of the sedimentary strata, but also of some of the volcanic rocks, has been noted in the constant slips and slides of rock and earth down the sides of the cutting into the bed of the canal that is to be. This source of expense and delay was always foreseen by those who knew the character of the soil and the power of torrential tropical rains, and was long dwelt upon as a fatal objection to a sea level canal. It has caused even more delay and more expenditure than was expected. But it has now been overcome, though to avert the risk of future damage to the work when completed, the engineers have been obliged to give a much lower slope to the sides of the cutting than was originally contemplated.

The interior of the Culebra Cut presented during the period of excavation, a striking sight. Within the nine miles of the whole cutting, two hundred miles of railroad track had been laid down side by side, some on the lowest level on terraces along which the excavating shovels were at work. Within the deepest part of the cutting, whose length is less than a mile, many hundreds of railroad construction cars and many thousands of men were at work, some busy in setting dynamite charges for blasting, some clearing away the rubbish scattered round by an explosion, some working the huge moving shovels which were digging into the softer parts of the hill

or were removing the material loosened by explosions, the rest working the trains of cars that were perpetually being made up and run out of the cutting at each end to dump the excavated material wherever it was needed somewhere along the line of the canal. Every here and there one saw little puffs of steam, some from the locomotives, some where the compressed air by which power was applied to the shovels was escaping from the pipes, and condensing the vapor-saturated atmosphere.

There is something in the magnitude and the methods of this enterprise which a poet might take as his theme. Never before on our planet have so much labor, so much scientific knowledge, and so much executive skill been concentrated on a work designed to bring the nations nearer to one another and serve the interests of all mankind.

(From an article in *The St. Louis Times*, October 8, 1913, by Edward B. Clark, Colonel Gaillard's classmate at West Point.)

[On October 10, 1913, while Colonel Gaillard was at Johns Hopkins suffering under that nervous breakdown, which was so soon to prove fatal, plans were completed for turning the water into Culebra Cut. On the appointed day President Wilson, at Washington, pressed an electric button and the dam at Gamboa, on the Isthmus, was blown asunder, letting the waters of the Atlantic into the cut.]

The explosives are ready, the mine drillings have been made and the train is laid to blow into destruction the last land barrier which traverses the Isthmian waterway from bank to bank. Shortly the spark will be applied, the rock and earth embankment will disappear under the fires of explosion and the waters of Gatun Lake will pour into the Culebra Cut which quickly will fill to the required level, and the way will be clear for the first ship to sail from ocean to ocean.

One of the tragedies of the canal is the serious illness of Lieut.-Col. David DuB. Gaillard. The man who captured the landslides and dug the Culebra Cut cannot be present to witness the unchaining of the waters and the final proving of the integrity of his six years of labor under the tropical sun.

Col. Gaillard, as the country already knows, is now in a hospital in the United States, having been stricken with a nervous disorder virtually on the day of his completion of one of the greatest works in the history of engineering. . . .

In the near future, when ships pass through the Culebra Cut, the voyagers will see a high bank rising on either side covered with the green growth of the tropics. The clay and the rocks will be clothed more quickly than was the northern cliff which Bjornson pictured so vividly in its transformation.

Looking on the banks, the passing traveler, unless he knows the history of the canal, will think that his ship is making its way through a natural valley and perhaps all thought will be lost by the wayfarer of the travail, the time and the high engineering skill which it took to dig and to cut this commercial pathway through the continental divide.

This work is the triumph of an American army officer, born in the State of South Carolina. Engineers say it will go into history as one of the great labors of the age. When Lieutenant-Colonel Gaillard took charge at the beginning of the work, he knew that he must overcome the landslides which were bound to start when the mountains through which he was to make his way showed that their footholds were becoming insecure.

Gaillard made his way fighting. Literally he was

obliged to shackle the feet of the mountains. He did it and the chaining is for all time.

(From *The Baltimore American*, December 6, 1913.)

Colonel Gaillard was the real builder of the Canal, but when Gamboa Dike was blown up and the waters of the Atlantic and the Pacific met for the first time he lay unconscious in his bed in the hospital, unaware that President Wilson had pressed the button that ignited the hundreds of pounds of dynamite, completing his work. The building of the canal was his cherished dream. His constant study and concentration of mind on the work and the realization of the danger incurred by the thousands of men under him is thought to be the primary cause of his illness. Mrs. Gaillard said that many nights had been spent by the Colonel in studying methods that would prevent the landslides and the next morning he would be at work again.

GAILLARD AS A SOLDIER

By Stephen M. Foote, Colonel Coast Artillery Corps,
U. S. A. (Late Major Third U. S. Volunteer
Engineers.)

GAILLARD AS A SOLDIER

At the time of his death, Gaillard was a member of the Isthmian Canal Commission, and he is known the world over as the Engineer who made the cut for the Great Canal through Culebra Mountain.

In his service as an engineer before the Spanish War he had assisted in determining two international boundaries—the Mexican and the Alaskan. After the Spanish War, while engaged in river and harbor work on the Great Lakes, he wrote a notable study on the effects of wave action in relation to engineering structures.

It was while he was on the General Staff that he was selected as one of the members of the Isthmian Canal Commission. It will be remembered that it was President Roosevelt's desire to have the Panama Canal built by civilian engineers and that the various engineers connected with that work were all celebrated in their profession and came from different parts of the country. As soon as one of these engineers was put in charge of the canal construction, he became a marked man and great corporations immediately sought his services, offering enormous salaries. In this way they succeeded in alienating several chief engineers from the canal. After the embarrassing changes thus resulting, the President, early in 1907, decided to place the work in the

hands of Army Engineers. To insure against radical changes due to the loss, for any reason, of the Chief Engineer, he decided to appoint a Commission of three engineers, with the idea of having two understudies ready and competent to automatically take up the work of Chief Engineer if it should at any time be dropped by the Chairman of the Commission. Gaillard was one of the three so chosen. His part in the building of the canal for over six years continuously is worthy of all the praise that has been bestowed upon it. The story of his services on the canal can be properly told only by one who was there associated with him during those years.

Gaillard's abilities as an engineer and executive were so pronounced and have become so well known that his ability as a *soldier* has been overlooked. People generally do not know of his soldierly qualities, and yet it would be safe to venture that no achievement of his as an engineer gave him more pride and satisfaction than his service from June, 1898, to May, 1899, as Colonel of the 3rd United States Volunteer Engineers.

In his military as in his civil undertakings, Gaillard never blindly relied upon bluff and self assurance. He had a keen perception of the responsibilities of any position he ever held, and while he realized to the full the difficulties before him, his active mind instantly sought the way out; he always rose to the occasion and enlisted not only his own abilities but those of his associates in overcoming the difficulties.

While his regiment did not have occasion to enter an active campaign, it did splendid service in the regeneration of Cuba during the early months of 1899,

winning the most flattering encomiums from all who came in contact with any part of it. And it was able to do this because its colonel had from the first labored incessantly to make it an efficient regiment for any duty it might be called upon to perform.

Gaillard was a good judge of men and knew for what purposes and to what extent he could rely upon his immediate subordinates. Within such limitations he gave them his confidence and was rarely at fault. As a consequence, he attained the unlimited confidence and unswerving loyalty of his officers and men.

The camps of the 3rd Engineers in the Spanish War were models for all the troops around them. While in camp at Lexington, Kentucky, shortly after the regiment had been mustered into the service, the Colonel sought an opportunity to give his men target practice. Authority was secured, a target range obtained and the men given the practice. A perfectly natural thing to do, one might say, but it was a thing not generally done by the Volunteers at that time.

As infantry, probably no regiment of its time was better drilled in camp and field, while in engineering of every description—military, railway, sanitary, topographical—it was perfectly at home. The military engineering it was necessary for the members of the regiment to learn by means of daily drills in that subject, but with so many of the officers and men professional civil engineers, they made apt pupils in every line of military engineering.

While in camp at Macon, Georgia, in the fall of 1898, the 3rd Engineers was given the delicate task of disarming a mutinous state volunteer regiment, which task was performed in a manner that brought

forth many expressions of praise from higher commanders.

In Cuba, the regiment was dispersed, the regimental headquarters and one battalion going to Cienfuegos, one battalion to Matanzas, and one to Pinar del Rio. Their work in Cuba was mostly of a constructive nature, and embraced roads, wharves, railroads, sanitation, surveying, etc., but their strictly military duties were not less important, as it became necessary for them to guard and care for a large number of Spanish prisoners awaiting repatriation.

On its return from Cuba for muster out, the regiment was together for about three weeks at Fort McPherson, Georgia, and during this time there was a short drill and a parade daily, maintaining military discipline to the end.

Furthermore, he took great pride in the good name of the regiment and instilled the same feeling in others. The regiment thus acquired in high degree that valuable asset, *esprit de corps*. So deep was this feeling that associations of officers and men of the 3rd Engineers have been in active existence since the muster-out of the regiment.

To the men of the regiment and probably to some of the officers the Colonel was the able, just and considerate commander, but to those who had the privilege of knowing him intimately, he was a most delightful companion. His clever anecdotes and stories were always apropos, his lively raillery was never practiced except on his friends, his keen shafts of wit were never poisoned.

And so we like to think of those pleasant hours with him, and a smile breaks upon the lips even in our sadness.

**OFFICIAL ACTIONS
TAKEN UPON THE DEATH OF
COLONEL GAILLARD**

OFFICIAL ACTIONS TAKEN UPON THE DEATH OF COLONEL GAILLARD

RESOLUTIONS AND PROCEEDINGS IN CONGRESS

(From the Proceedings of the United States Senate, *Congressional Record*, page 422, Dec. 8, 1913.)

LIEUT.-COL. DAVID DUBOSE GAILLARD

Mr. O'GORMAN. Mr. President, as chairman of the Committee on Interoceanic Canals, which has had Colonel Gaillard's work on the canal under constant observation, and is therefore entirely familiar with the magnitude of the services he rendered the Nation, I beg to introduce the following resolution:

The PRESIDING OFFICER (Mr. Walsh in the chair). The resolution will be read.

The Secretary read the resolution (S. Res. 233), as follows:

Resolved, That the Senate of the United States has heard with profound sorrow of the death of Lieut.-Col. David DuBose Gaillard, to whom the American people are under lasting obligations for the splendid service he rendered in overcoming some of the most perplexing difficulties in connection with the construction of the Panama Canal.

Resolved, That in further testimonial of our esteem the Secretary of the Senate be authorized to forward a copy of these resolutions to the family of Lieut.-Col. Gaillard.

Mr. O'GORMAN. I ask unanimous consent for the immediate consideration of the resolution.

The PRESIDING OFFICER. Unanimous consent for the immediate consideration of the resolution is asked. Is there objection?

There being no objection, the Senate proceeded to consider the resolution.

Mr. SMITH of South Carolina. Mr. President, I should like to state in this connection that Lieutenant-Colonel Gaillard was a native of my county and lived most of his early life in my county town. I am not going to make any remarks upon his character, for that is well set forth in an article which appeared in one of the newspapers of my State, which I send to the desk and ask unanimous consent to have printed in the *Record*. My colleague (Mr. Tillman), is unavoidably absent on account of sickness for the remainder of the afternoon. He being the senior Senator from South Carolina would naturally have presented these testimonials. If he were present he would be glad to make some remarks upon the character and work of this splendid son of South Carolina.

The PRESIDING OFFICER. Without objection, the matter presented by the Senator from South Carolina will be printed in the *Record*. The Chair hears none.

The matter referred to is as follows:

In South Carolina the death of Colonel Gaillard brings first of all sorrow, and in the hearts of many a sense of personal loss which overshadows the feeling of regret at the ending of a career which cast so bright a reflection on this State, which for the moment blunts the realization of the tragedy and pathos of this quiet exit from the stage of life before the

spotlight had been turned full upon his mammoth work or the applause of the Nation had reached his ears. For Colonel Gaillard was not only admired, not only honored in his native State, he was widely beloved. Family and friends, of whom he had many, particularly in Clarendon and Sumter Counties, here in the city of Columbia, and in Fairfield, grieve not primarily because the eminent engineer has finished his career, not that the "conquerer of Culebra" has thus sacrificed himself in successfully circumventing nature's treasonable intent against the canal project, but that David Gaillard, the man, is dead. Those who knew him best, valued him for the rare charm of his personality, for his refreshing fun and wit, for a sincerity, a simplicity, a modesty of nature which insured him through every success against a change in attitude toward people or an altered estimate of the real values in life.

On each leave of absence he came to put himself in fresh touch with South Carolina and South Carolinians, and only last June he spent a few days here with relatives in Columbia and visited members of his family wherever they were scattered throughout the State. On that occasion, when a meeting with him or the mention of his name brought a realization of his achievement on Panama, he was to his friends unchanged, unaffected, cordial, and entirely lacking in self-consciousness. And as success and fame had seemed unable to work in him their perhaps not unexpected change, so time, too, appeared to have made unsuccessful onslaughts; his eye was as keen and as kindly as ever, his figure as lithe and erect, his movements as quick and energetic, and his step as short and nervous as he advanced toward the

fifty-fourth milestone in his life journey, in appearance a man of certainly a dozen years younger. It was almost immediately upon his return to the Canal Zone after that visit that his fatal breakdown occurred, shocking those who had so recently seen him and whose thoughts have since been very constantly with him in his losing fight for life.

Colonel Gaillard's career since entering the Army is well known, there having been occasions from time to time to outline his assignments and attainments as one of Uncle Sam's most efficient engineers. . . . From the time he graduated, in 1884, he had an exceedingly varied career, intrusted with an unusual number of important Government commissions of peculiar character and not once having been with a regiment or a battalion except during the Spanish-American War, when he was Colonel of an Engineer regiment. He had been out of West Point but a few years, when he was appointed by the President one of the three commissioners to determine the boundary line between Mexico and the United States from El Paso, Tex., to the Pacific coast.

When he completed this work, which brought him many interesting and romantic experiences of camp life in the desert as well as many stern and strenuous mental and physical tests, he was complimented in a state paper by the Secretary of State. Then he was ordered on duty in the construction of fortifications and a sea wall at Fort Monroe. One of the most valuable works on which Colonel Gaillard ever engaged was the Washington Aqueduct, having been put in sole charge of this work when he was only a first lieutenant.

He went from Washington to Alaska upon an

important secret commission of the Government. Nominally, as the order reads, he was sent there upon work on the Portland Channel, but his task, it was thought, had something to do with international complications between this country and England. After he had finished this work, for which he was highly complimented by the Secretary of War, he was put on the staff of Maj.-Gen. James Franklin Wade and served at Tampa and Chickamauga. . . .

Colonel Gaillard, like his engineer comrades of the Army, labored at Panama, moved by the spirit of obedience to orders and a desire that the work should be well done, but also he was quickened to most painstaking endeavor by the knowledge that the Engineer Corps of the Army was on trial in a work upon which civilian engineers had turned their backs. He spared himself not at all, and it was only after he had solved his great problem and had sighted the end of his task that his strength failed.

The VICE-PRESIDENT. The question is on agreeing to the resolution.

The resolution was unanimously agreed to.

(From Proceedings of the United States House of Representatives, *Congressional Record*, page 386, Dec. 6, 1913.)

LIEUT.-COL. DAVID DuBOSE GAILLARD

Mr. AUSTIN. Mr. Speaker—

The SPEAKER. For what purpose does the gentleman from Tennessee rise?

Mr. AUSTIN. Mr. Speaker, I rise for the purpose of asking unanimous consent for the consideration of a resolution in reference to the death of Lieutenant Colonel Gaillard, of the Panama Canal.

The SPEAKER. The gentleman from Tennessee asks unanimous consent to consider a resolution of regret or condolence on the death of Lieutenant Colonel Gaillard, one of the Panama Canal constructors. Is there objection?

Mr. MANN. Mr. Speaker, reserving the right to object, let us hear it read.

The SPEAKER. The Clerk will read the resolution.

The Clerk read as follows:

Resolved, That the House of Representatives has heard with profound sorrow of the death of Lieut. Col. David DuBose Gaillard, for whose conspicuous and valuable services in connection with the construction of the Panama Canal the Nation is indebted.

Resolved, That the Clerk of the House transmit a copy of these resolutions to the family of the deceased.

Mr. MANN. Mr. Speaker, reserving the right to object, I think ordinarily resolutions of this sort ought not to be presented or considered by the House, but I think this is a conspicuous instance where we ought to vary from the ordinary rule, and therefore I do not object.

The SPEAKER. Is there objection? [After a pause.] The Chair hears none.

The question was taken, and the resolution was agreed to.

The prompt action of the House of Representatives was commented on in the *Baltimore News* of Dec. 6, 1913, as follows:

Washington, Dec. 6.—The House took an unusual action today when it unanimously adopted a resolution of regret over the death of one outside of Congress, but who had rendered conspicuous service in various engineering feats.

This resolution of regret over the death of Colonel Gaillard, who virtually gave his life in the building of the Panama canal, was almost unprecedented. Speaker Clark recalled that only upon one occasion had a somewhat similar resolution been adopted.

OFFICIAL ORDER IN THE CANAL ZONE

LIEUT.-COL. DAVID DuBOSE GAILLARD

(Gen. Geo. W. Goethals, in *Canal Record*, Dec. 10, 1913.)

The cable brings the sad news of the death of Lieut. Col. D. D. Gaillard, Corps of Engineers, U. S. A., member of the Isthmian Canal Commission, on the morning of December 5, 1913, at Baltimore, Md.

Colonel Gaillard was born in Fulton, Sumter County, South Carolina, September 4, 1859. He was graduated from the West Point Military Academy in 1884, and was appointed Second Lieutenant of Engineers on June 15, 1884. After graduation from the Engineering School of Application, he served on River and Harbor and Fortification work in various parts of the United States; and from February, 1892, to December, 1894, was a Commissioner on the Mexican Boundary Survey. During the war with Spain, he was appointed Colonel of the Third United States Volunteer Engineers, serving in the United States and Cuba in 1898 and 1899, a part of the time as

Chief Engineer of the District of Santa Clara in Cuba. He was Assistant to the Engineer Commissioner of the District of Columbia following his service in Cuba, until February, 1901. On the organization of the General Staff of the Army, he was selected as one of its members, and was engaged on this duty when appointed a member of the Isthmian Canal Commission in 1907. He arrived on the Isthmus in March, 1907, and was appointed subsequently head of the Department of Excavation and Dredging, retaining that position until a new organization was created on July 1, 1908, when he was made Division Engineer of the Central Division, which included the Culebra Cut. He was in charge of the work in the Cut until its virtual completion, being compelled to abandon his duties through illness in July last.

Colonel Gaillard's period of Canal service was coincident with that of the other engineering members of the present Commission, and included the years of most active construction work. He brought to the service trained ability of the first order, untiring zeal and unswerving devotion to duty. His name is connected inseparably with the great task which was brought to completion under his guidance and will be held in lasting honor. His associates mourn him as a valiant soldier, true man and beloved companion.

GEO. W. GOETHALS,
Chairman and Chief Engineer.
Culebra, C. Z., December 6, 1913.

OFFICIAL ORDER, CHIEF OF ENGINEERS

War Department, Office of Chief of Engineers,
Washington, Dec. 9, 1913.

General Orders, No. 31:

To the Corps of Engineers is announced the sad intelligence of the death of Lieut.-Col. David DuB. Gaillard, Corps of Engineers, which occurred at Baltimore, Md., on Dec. 5, 1913.

(Then follows an account in detail of Colonel Gaillard's military career, the facts of which will be found in the sketch of his life, already given, and also summarized in the chronology at the end of this volume; and also a copy of the Resolutions adopted by the Senate and by the House of Representatives of the United States, which are set out in the preceding pages 57, 62. The full text of the order is given on pages 156-159, post. The order concluded):

As a tribute to his memory the Officers of the Corps of Engineers will wear the usual badge of mourning for 30 days.

By command of Chief of Engineers,

EDW. BURR,

Colonel, Corps of Engineers.

REPORT OF THE INTERSTATE COMMERCE COMMITTEE OF
THE HOUSE OF REPRESENTATIVES

(Report 122,630 Congress, 2nd Session, by Hon. William C. Adamson of Georgia, Chairman.)

In contrast with the stupendous enterprise on which Lieutenant-Colonel Gaillard and his associates and their illustrious chief, Colonel Goethals, have achieved such unexampled success, kindred enterprises in other countries and other ages sink into

insignificance. Darius, with his conquering army, completing the old Suez canal begun and abandoned by the old Egyptian king, to be again abandoned and relegated to sand dunes and disuse for ages, presents but a poor comparison. The ostentatious performance of Xerxes in constructing the canal across the peninsula of Athos, with the money and men of all nations, was a mere matter of sport indulged to but little purpose or profit beside the stupendous achievements at Panama. The canals at Kiel and Corinth do not approach our Panama construction in magnitude, engineering skill, or universal importance to mankind.

The later revival of the Suez Canal was but a renewal of the work of monarchs in antiquity, and though backed by the power and finances of all Europe, presents no analogy or comparison to the work accomplished by the mighty Goethals and his never-failing lieutenants.

It was and is the undoubted purpose of Congress to render fitting honor to the builders of the canal, recognizing each in degree corresponding to his position and rank in the enterprise. The untimely death of Lieutenant-Colonel Gaillard places him beyond the possibility of hearing our plaudits, enjoying the incense of our honors to him, profiting by our rewards.

Any civilized nation would be proud to boast of such achievements as will stand to the everlasting honor of the builders of the Panama Canal. Those surviving will, without question, reap the rewards of their toil in the lasting gratitude of a proud people and such other rewards as may be adjudged fitting to their rank and performance. But as Lieutenant-

Colonel Gaillard is dead, his ear deaf to our plaudits, his brain no longer conceiving and executing great designs, his heart throbbing no more in unison with that once mighty intellect, we can do nothing more for him in person, but the life partner, the solace of his sorrows and depressions, the inspiration for his buoyancy, courage, and mighty achievements, his bereaved widow still lives to mourn his loss. We mourn with her. We honor her and we honor him in honoring her. She gave the best years of her life and impaired her health in the tropics co-operating with her husband in consecrating his skill and energy to consummate an enterprise which has been the dream and will be the wonder of the world, and at last saw her husband immolated a willing sacrifice to the honor and glory of his country.

TRIBUTES

TRIBUTES

HON. LINDLEY M. GARRISON, SECRETARY OF WAR.
(*Baltimore American*, Dec. 6, 1913.)

Upon being advised of the death of Colonel Gaillard, Secretary Garrison sent the following telegram to Mrs. Gaillard: "Mrs. Garrison and I tender our heartfelt sympathy in this sad hour. It grieves us very much to learn of your great loss."

The Secretary has a keen sense of appreciation of the services which Colonel Gaillard rendered the Government not only in connection with the excavation of the Panama Canal, but in important engineering projects in the United States, including fortifications and river and harbor improvements and work of great technical value in connection with the survey of the Mexican boundary. An order had been issued extending an indefinite leave of absence to Colonel Gaillard in order to afford him an opportunity, by complete rest, to recover from his illness.

Secretary Garrison wrote personally to the Colonel: "I do not wish you to return to your work until you are so completely recovered that there is no danger of a recurrence of your existing trouble. I cannot let this occasion pass without saying to you that there is the fullest appreciation of your most valuable services."

MAJ.-GEN. GEORGE W. GOETHALS

(*Public Ledger*, Philadelphia, Dec. 5, 1913.)

[The official tribute issued by General Goethals and printed in the *Canal Record* of Dec. 10, 1913, is given on pages 63-64.]

Col. George W. Goethals when informed of the death of Colonel Gaillard said:

I am deeply shocked to hear of the passing of Colonel Gaillard. He was a great engineer, an unflinching worker and a true gentleman. While his death of course was not unexpected, I feel it is a deep personal loss to me.

FORMER PRESIDENT THEODORE ROOSEVELT

I am very glad that a memorial is being prepared for Col. D. D. Gaillard. When I appointed Colonel Gaillard on the Isthmian Commission, it was because of the very high reputation he bore. His work on the Isthmus admirably sustained this reputation. He was one of the servants of the United States who added to his country's honor, dignity and usefulness. (Aug. 16, 1915.)

FORMER PRESIDENT WILLIAM H. TAFT

I knew Colonel Gaillard, but not very intimately. He was a very competent engineer and a most enthusiastic worker in the cause of the Government. I have no doubt that the work which he did in the tropics and under the trying conditions that existed brought about the illness which led to his death. He therefore sacrificed himself in the same way that a soldier does in battle. He contributed substantially to a great work and Congress recognized his merits. I am deeply sorry that he has not been spared for many more years of usefulness to his country. (June 19, 1915.)

HON. HENRY L. STIMSON
Secretary of War, 1911-1913

Colonel Gaillard's illness and death did not occur until after the close of my term of office as Secretary of War and my only action in reference to the matter was a personal letter of condolence to Mrs. Gaillard. He was a most efficient, loyal and distinguished officer and, as I had an opportunity of seeing personally, the great work of the Culebra Cut is very largely a record of those qualities of his character. He deserves well of his country and I know that his host of friends will be very glad that a memorial of his life has been undertaken. (Oct. 22, 1914.)

HON. JACOB M. DICKINSON
Secretary of War, 1909-1911

I esteem it not only a duty to his memory, and to the American people whom he served with such distinguished ability and fidelity, but a privilege to put on record my estimate of the life, character and services of the late Col. David DuBose Gaillard.

As Secretary of War I was for a period of two years constantly in touch with his work in making the Panama Canal, not only through official correspondence and reports, but a part of the time through personal observation on the ground. I had full information in regard to that work, and can speak of it and him with confidence. He was possessed of and put forth the highest professional skill, with a fidelity to duty, and a disregard of care for himself that could not be excelled. It is my conviction that he sacrificed himself for his country as truly as if he had died upon the field of battle. The

record of an officer so brilliant, so accurate, so untiring, so faithful even unto death, is a proud heritage for his family and his countrymen who will keep his name in grateful and enduring remembrance. (Sept. 30, 1914.)

LIEUT.-GEN. J. C. BATES, U. S. A. (RETIRED)

Late Chief of Staff

I first knew Colonel Gaillard when he reported to me with his regiment at Macon, Georgia, in the fall of 1898. In January, 1899, he again joined me at Cienfuegos, Cuba, with part of his regiment, and in addition to his regimental duties, he served on my staff as Chief Engineer of the Military Department of Santa Clara, Cuba, and later he served on my staff at St. Louis, Mo., as an officer of the General Staff of the Army.

He has earned so high and world-wide a reputation as a constructive engineer that I make no further remark on that phase of his life's work, but speak of him as a soldier. I never knew a better volunteer regiment than the Third U. S. Volunteer Engineers, whose enlisted personnel consisted of men of excellent intelligence. The officers had to pass a rigid examination before being commissioned, and the field officers and several of the regimental staff officers were trained soldiers, but Colonel Gaillard must be given a large share of the credit for the high degree of discipline and efficiency attained by the regiment.

As an officer of the General Staff he performed highly important duties with marked energy and efficiency. Colonel Gaillard was an all round officer and in his untimely death our country lost a valuable

asset, for he was eminently qualified for very high command. He was a genial companion, and a lovable and noble man. (Dec. 4, 1914.)

BRIG.-GEN. JAS. H. WILSON, U. S. A. (RETIRED)

When I took command of the First Army Corps at Lexington, Kentucky, on October 20, 1898, I found Col. David DuB. Gaillard, of South Carolina, commanding the Third Regiment of United States Volunteer Engineers, which had been organized at Jefferson Barracks in June of that year. It was composed of twelve companies, divided into three battalions, each commanded by a graduate of West Point. The company officers were generally young Civil Engineers, who had carefully selected the non-commissioned officers and enlisted men of the regiment.

Although his regiment had been only a few months in service, both officers and men had already caught the discipline and bearing of well trained regulars.

Upon transfer to Cuba, the three battalions of this regiment were immediately utilized in the survey of the towns, cities and surrounding country and in the systematic study of their conditions, resources and economic requirements. A spirit of perfect discipline and a high degree of intelligence prevailed from the first, and the thoroughness with which all did their work and made their reports were most creditable to both men and officers as well as to the country they so admirably represented.

The experience in command of the Third U. S. Volunteer Engineers was but a brief and brilliant episode to Gaillard in the career of a scientist and

a savant. It showed the country just what the highly trained West Point soldier could do for it in the actual organization and command of troops and left Gaillard with increased powers and experience, free to return to duty as a Captain of Engineers.

His work upon "Wave Action" placed him at once in the first rank of West Point Hydraulic Engineers and doubtless did its part in securing for Colonel Gaillard his detail as a member of the General Staff corps, Chief of Staff to the Department of the Columbia, Assistant Chief of Staff to the Northern Division; to membership of the Army War College; of the General Staff corps; as Assistant Chief of Staff in the second occupation of Cuba; and finally, on March 22, 1907, as a member of the Isthmian Canal Commission.

As Supervising Engineer in charge of dredging the harbors, the body of the canal below the tide level, and finally of excavating the Culebra Cut through the central ridge of the Isthmus of Panama, Colonel Gaillard gained the chief honor of his useful life. In every phase of his crowning work in charge of the Central Division, he was left in direct control and made many improvements and economies in the plant and its management.

Colonel Gaillard devoted himself so constantly and so assiduously to the great work of the canal that his health finally became so hopelessly impaired as to cause his death. He would accept no relief till it was too late to save his life, and he died a martyr to his sense of duty and to the high standard of the profession in which he had now become distinguished throughout the world. It was well known to his companions of the Corps of Engineers,

that Gaillard was not only an engineer of great learning but of unfailing judgment and capacity, and it is to be remarked that notwithstanding his scholarship and scientific attainments he was looked upon by the Army as an eminently practical, all-around man, and by those who served with him, as an ideal American soldier. (Dec., 1914.)

BRIG.-GEN. H. M. CHITTENDEN, U. S. A. (RETIRED)

A Member of Colonel Gaillard's Class at West Point

(In January, 1914, Bulletin of the Class of 1884, U. S. Military Academy.)

To lay down one's life upon the field of battle in voluntary service of fatherland has been considered in all ages the loftiest expression of patriotism, if not of heroism itself. To fall as Gaillard has fallen—is it any less true heroism? Any less self-sacrifice upon the altar of country? Not amid the din of armed conflict, nerved by the frenzy of an hour or a day, but at the end of long years of patient, exacting work, of terrific responsibility, the tragic end has come. But it is just as much a direct result of the struggle itself as if it were the work of a hostile bullet, and the exalted standard of duty which his career exemplified will command the increasing admiration of men as long as his work in the Isthmian hills endures.

We grieve that he could not have remained to enjoy the fruits of his well-earned fame. But there is compensation in the thought that to him was reserved the higher privilege of laying down his life work just as it was crowned with success. Like Wolfe on the Plains of Abraham, he has been called with the plaudits of victory ringing in his ears. Whatever may come to others, his record is secure.

Colonel Gaillard served as one of my assistants for a long period in the War College branch of the General Staff of the Army, and whilst so serving gave evidence of that marked ability which has characterized his entire service in the Army. I, like everyone else who ever served with Colonel Gaillard, had a deep admiration and respect for him. (Sept. 25, 1914.)

BRIG.-GEN. JOHN M. WILSON, U. S. A. (RETIRED)
(Late Chief of Engineers)

It was my good fortune to have been honored with the acquaintance of the late Col. David DuB. Gaillard for a number of years.

I regarded him as one of the ablest, bravest, most accomplished officers of Corps of Engineers of the United States Army, and as a cultivated gentleman of the highest type of character; honorable in every sense, firm and true in peace and war. Generations shall come and pass away ere the beloved name of this hero will be forgotten by the Nation. He gave up his life in the interest of the great work in which he was engaged on the Panama Canal, remaining on duty till his physical strength was exhausted.

His name should be carved high upon the tablet of fame of the heroes who have given up their lives in the interest, welfare and prosperity of our great Nation. (Sept. 25, 1914.)

A TRIBUTE

How is it possible to put into words any adequate tribute to the memory of a friend of many years? How much more difficult is this when in addition to worth as a man and a friend, eminence as an engineer who has advanced his profession along widely different lines, is to be portrayed?

My acquaintance with Colonel Gaillard goes back to his cadet days, when some of his work at the drills in practical military engineering first brought him to my attention as his instructor. Later, after graduation, his first practical work was as my assistant in the Florida District of river and harbor improvements, where, for four years, we were closely associated. From 1887 until the end of his life, in the varied stations and duties of our corps, we were thrown together from time to time. Always it was a pleasure to meet him; always a profit to learn of his work.

Very early in his career he manifested the qualities which were sure to lead to eminence in his profession—an intense devotion to duty—strong common sense—an unusual power of observation and analysis by which he saw not only what was being done and how it was being done, but also how methods could be bettered and greater results obtained. It surely was no small thing for a young engineer, with practically no funds for experiment, to undertake the analysis of wave action, to devise a simple and practical instrument for recording wave pressures, and to measure the force of the breakers which he was combating in his work on the sandy coast of Florida. Yet the first work on this

line of study was done in Florida in 1888, work which later resulted in his book on "Wave Action in Relation to Engineering Structures," which has become a standard book of reference on this difficult subject among the engineers of the world.

From 1891 to 1896 he was a member of the Mexican Boundary Commission, and had duties of great responsibility. For a large part of this time he was in the field and traversed the entire boundary line from the Rio Grande to the Pacific Ocean. Of hardships there were many, but his friends later heard from him only the many humorous incidents which a man with his sense of fun was sure to find on such a journey, through the deserts, with a party originally composed mainly of scientific tenderfeet.

After this duty he was for a time on fortification duty at Fort Monroe, and later in Washington, in local charge of the Washington Aqueduct and water supply. It was while there that his superiors showed their confidence in him by selecting him for a peculiarly delicate piece of work in Alaska.

At the outbreak of the Spanish War he was promptly assigned to military duty as Engineer Officer on the Staff of General Wade. A little later he was appointed Colonel of the Third Regiment of Volunteer Engineers, recruited from the South. This regiment was organized too late to participate in the actual fighting, but in December, 1898, and in January and February of 1899 it was sent to Cuba by battalions and stationed at Matanzas, Cienfuegos and Pinar del Rio. There a fruitful field for activity was found in the sanitation and engineering problems of those portions of the Island, until May, 1899, when the Regiment was returned to the United

States and mustered out. It is said that the Commanding General of the Province of Santa Clara, himself a veteran of the Civil War and a distinguished soldier, stated that in all his experience he had never seen a better volunteer regiment than was the Third Regiment of Volunteer Engineers—a tribute indeed to its Colonel.

After the war came various duties, carried out with characteristic fidelity, energy and ability. Colonel Gaillard never was satisfied with good enough. Each class of duty was marked by some achievement in the betterment of methods.

So it was but natural that, when in 1906 President Roosevelt was engaged in organizing the staff of engineers for the great work at Panama, he selected Colonel Gaillard as one. To him fell the task for which it was supposed that officers of the Corps of Engineers from their training and experience were least fitted—the completion of the Culebra Cut—supposedly primarily a job of railroad engineering and management. How well he did this work, how the useful output of each machine, engine and car was practically doubled under Colonel Gaillard's unceasing care is a matter of history. To us who knew the man, the results were not surprising—simply expected. It was a wonderful experience to walk through the cut with Colonel Gaillard on one of his tours of inspection. Not a step was without an instructive reminiscence, and not a recital without that humorous accompaniment which was so enjoyable. The torrid heat and the rough going were forgotten and the six-mile tramp seemed but a short stroll.

Without doubt it was his hard work and anxiety

on the Isthmus which shortened his life, but equally without doubt, had this result been foreseen, the work would have been done with the same disregard of self.

Any memory of Colonel Gaillard would be incomplete without some allusion to his home life. From the day when she came to Florida as a bride, to the end, Mrs. Gaillard was always the devoted companion, friend and helper. With their son, she shared his lot always, in city or desert, at home, in Cuba, in Panama. No one who visited their home at Culebra can ever forget the wonderful scene of beauty created there out of what had been a jungle.

It was fitting that both houses of our Congress should have taken official notice of the death of Colonel Gaillard, for in his death the country lost one of her most useful citizens, dead in line of duty. But what can the rest of us do? How can we express our sense of personal loss of a man admired and respected as an officer and an engineer and beloved as a friend? (Feb. 10, 1915.)

MAJ.-GEN. W. C. GORGAS, SURGEON GENERAL, U. S. A.
(Late Member Isthmian Canal Commission)

GAILLARD AS A FRIEND

I first met Colonel Gaillard when he came to Panama in 1907, and was thrown with him very intimately for the next six years. As I look back through my life's companionships I can recollect few men for whom I formed as great a personal attachment as I did for Colonel Gaillard. Colonel Gaillard's work was located for about nine miles along the Culebra Cut. My sanitary inspections nearly every week took me to some part of his work.

I would usually telephone him the day before, letting him know where my sanitary inspections would carry me, and ask him to appoint a place and hour where and when we should meet. In this way we generally spent half a day together nearly every week. These expeditions are among the most agreeable recollections which I retain of the Isthmus. He was always bright, cheerful, witty and entertaining.

I was naturally interested in the great engineering problems which he had in hand, and these he had the faculty of making most clear and interesting to my non-engineering mind.

It was most surprising to me to see, from week to week, as I went on the work, how he had overcome the difficulties which had seemed to me a short time before insurmountable. I remember, in particular, my surprise at the astounding way in which he steadily reduced unit cost in this part of the work during the years of his administration.

No history of this work would ever be able to make plain the handicaps under which he labored, and the administrative difficulties against which he had to contend. It was a source of great satisfaction to me to believe that my liking and friendship were returned by him. We were together the last day he spent on the Isthmus and lunched together just before he sailed. We all then knew that he was a very sick man. He took this occasion to express to me his warm friendship, and it is a great source of consolation to me to know that at this, our last meeting, I was enabled to make him understand how near and how valuable a friend he was to me. (Oct. 9, 1915.)

BRIG.-GEN. W. L. SIBERT, U. S. A.
(Late Member Isthmian Canal Commission)

(In report of the Forty-fifth Annual Reunion, June, 1914, of the Association of the Graduates of the United States Military Academy.)

Although stricken in middle age, David DuBose Gaillard served his country more effectively than most men are able to do in the ordinarily allotted number of years. His most striking characteristic was a marked alertness of both mind and body, coupled with a determination to know every detail of the work on which he was engaged, and to see that every step taken was founded on correct principles, be that step physical or moral. This with a genius for administration and organization coupled with indefatigable energy, constitute a combination from which great results should follow. We consequently find Gaillard at the age of 32 a member of the International Boundary Commission between the United States and Mexico. Upon first call to arms in the Spanish-American War, we find him requisitioned by Major-General Wade for duty as Engineer Officer on his staff. Then we find him, although only a captain in the regular establishment, appointed Colonel Third Regiment, United States Volunteer Engineers, and serving in Cuba. After the war with Spain we find him a member of the General Staff Corps, and again in Cuba during the second occupation of that island as assistant to the chief of staff of the forces there. Finally we find him appointed a member of the Isthmian Canal Commission and assigned to a duty that involved, among other things, digging the great cut through the Continental Divide at Culebra, the most trying,

discouraging and difficult feature connected with the building of the Panama Canal.

The surest proof of duty well done is the continual selection for duties more and more important.

In the performance of all the above work, the records show that the same determination to forget self and to fully master the duty at hand, whether that duty be the astronomical observations necessary in establishing an international boundary line, the preparation of a volunteer regiment for service in the field, or in keeping the tracks intact and the trains and shovels going in spite of the sliding mountain sides at Culebra.

When Gaillard was selected in 1907 as a member of the Isthmian Canal Commission and assigned to a duty that involved cleaving a passage way for ships through the Continental Divide at Panama, every one recognized the stupendousness of the task, and furthermore that success at a reasonable cost involved the best solution of an intricate problem in railroad transportation, a field practically new to Gaillard. The work was under way, with competent subordinates, and Gaillard first undertook a complete study of the bigger elements of the problem.

He noted that the loaded cars were taken from the shovels to extensive yards and there made up into trains and sent to the dumps. His studies indicated that if trains of suitable size could be partially loaded at one shovel, passed on to others, and finally when completely loaded go to the dumps, that the output of the steam shovels would be increased and that the same railroad transportation equipment would carry this increased output to the

dumps and thus bring about a material decrease in cost. The results proved the correctness of his deductions, and the resulting system of train movement in the Culebra Cut was highly praised by many visiting railroad transportation men.

After studying and unifying the general features of the work, Gaillard commenced a similar study of the smaller elements with a view of further increasing output and diminishing cost. This involved an immense amount of work, such as the selection of the explosive best suited to the various classes of rock, the best depth to drill holes and how best to space them; keeping records of performance and costs of repair of each unit of the varied and extensive plant; the relative cost of similar operations in the several subdivisions of the work, etc., etc.

As the work proceeded, the slides and other difficulties increased, and the burden became more severe; and just as victory was in sight he broke under the strain and was unconscious when the last barrier was destroyed that held back the waters of Gatun Lake from his essentially completed work.

The duty done and the results accomplished by Gaillard for his country are of permanent record and will be an inspiration for many young graduates of our Alma Mater, but the personal side of his character, his unselfishness, his unfailing courtesy, his genial manner, his quick, brilliant wit can only be of adequate record in the memory of those who knew him through sunshine and through rain.

LIEUT.-COL. CHESTER HARDING
Corps of Engineers, U. S. A.

(Extract from a lecture on "Personal Recollections of the Work on the Panama Canal," delivered before the Washington Society of Engineers on Jan. 6, 1914.)

How pathetic it is, what a tragedy it is, that on the day that the waters of the lake first flowed into the Culebra Cut, the man under whose brilliant leadership the victory was won, was lying in mortal illness far from the scene, unconscious of his triumph. His fame is secure. His name will be honored as one who sacrificed his life in the performance of his duty, in the same way that we honor, and teach the young to honor, a general who is killed on the field of battle while leading his forces to victory. How eminently fitting it would be for the Government to erect a monument to Gaillard's memory on the banks of the Culebra Cut.

COL. WILLOUGHBY WALKER
Coast Artillery Corps, U. S. A.
(Late Major Third U. S. Volunteer Engineers)

AT WEST POINT

Colonel Gaillard possessed the same lovable traits of character that endeared him to every one who knew him, while his standing in his class clearly indicated the high mental qualifications which subsequently won for him the high esteem in which he was held, not only by members of his own corps, but by everyone with whom he came in contact.

Of his service as Colonel of the Third United States Volunteer Engineers, it is unnecessary for me to speak. The high efficiency and excellent disci-

pline of the regiment were only a reflection of his personal character.

Although firm in the enforcement of discipline and in his demand that every man perform his full duty, it was nevertheless a great pleasure to serve under him, and I shall always recall my service in the Third Engineers as one of the happiest, as well as one of the most instructive, periods of my entire service in the Army.

In recognition of his crowning success in overcoming the almost insuperable difficulties of Culebra Cut, which made the Panama Canal a possibility, his name will surely be placed among those of the world's greatest engineers. (Sept. 29, 1914.)

PROF. J. L. VAN ORNUM

Head of the Department of Civil Engineering, Washington University; Associate of Colonel Gaillard Throughout Mexican Boundary Survey

(Late Major Third U. S. Volunteer Engineers.)

Colonel Gaillard was a distinguished officer of that corps of our military establishment celebrated for illustrious service. His exceptional qualification for duties of especial importance is attested by the repeated selection of him for positions of noteworthy trust, such as those of Commissioner of the Mexican Boundary Survey, Colonel of the Third U. S. Volunteer Engineers, and Isthmian Canal Commissioner; and the significance of his achievement in the removal of that stupendous barrier at Panama is justly recognized in the name "Gaillard Cut," which will ever remain a deserved tribute to him who gave his life to the accomplishment of this unparalleled undertaking. He was held in highest respect for his steadfast integrity and his intense

devotion to duty; he was admired for his discriminating judgment and his productive talent; he was honored for his supreme fidelity to his country's interests that were entrusted to his care; he was sincerely esteemed for that unassuming sincerity which is characteristic of the truly great, and he was loved for his loyalty to his friendships, his responsibilities and his ideals. (May 1, 1914.)

LIEUT. JOHN W. BLACK

(Late First Lieutenant and Battalion Adjutant Third U. S. Volunteer Engineers)

[Address at banquet of Officers of Third U. S. Volunteer Engineers at Aragon Hotel, Atlanta, May 17, 1899. The Regiment was mustered out of the Volunteer Army of the Spanish War upon the morning of that day.]

Mr. Toastmaster and Fellow Officers: It is somewhat of a surprise to me to have been called upon to supplement the remarks which have just been made, inasmuch as I have been with you so short a time* that I cannot be expected to say that which might best express your sentiments. However, it has required but a short association with you to discover many of the good qualities of our commanding officer, whose efforts seem to have been untiring for the good of the regiment, as shown by the high state of efficiency to which it has attained, which has been acknowledged by all those most competent to judge. It is indeed a privilege and an honor to have served under so worthy an officer, and I for my part shall never regret having joined you for muster out. Although we all may not have gained all we anticipated at the beginning of the war, yet we cannot but feel assured that had the opportunity

*Lieut. Black had been absent on detached service upon the staff of General James H. Wilson until a short time before the regiment returned from Cuba.

offered, we could not have failed to gain some personal glory, as a reflection of his worthy leadership. But after all it is not the strife of battle alone which develops bravery, nor the clash of arms which makes the hero, as often the bivouac and the camp bring out the instincts of the true man and the ideal soldier. In contemplating the short time we would be together before our paths in life would again separate, the idea impressed me that it would be highly fitting for us to present our worthy colonel with some token of our esteem, and appreciation of his efforts in our behalf; and the hearty response which met my suggestion is in itself enough to attest the high regard in which he is held, both as a man and a soldier.

Colonel Gaillard, I have the pleasure and honor of presenting to you this evening, as a token of our esteem and good will, and best wishes for the future, this loving cup. May it, while recalling to you the scenes of the campaign, also recall the personnel of the regiment, and the good fellowship which has always existed among us. We have tried to select something which would be acceptable, and which could be used not only in the field, but in your own home, where it can be enjoyed by your estimable wife, whose presence among us has on more than one occasion helped to cheer our soldier life, and who we regret could not have been with us at muster out. It is our earnest wish that you may be spared to your country and your family for many years, and that your cup of happiness may be filled to the brim. May you in the years to come, always find some of us to drink with you the toast, "The Third United States Volunteer Engineers."

EDITORIAL APPRECIATION

EDITORIAL APPRECIATION

Colonel Gaillard's death called forth from the entire press of the country most appreciative editorial comments upon his life and services and his untimely death. It is difficult to recall an instance when one who had been so little in the public eye, and whose name was comparatively little known to the people at large, has received tributes of appreciation from so great a variety of sources. The editorial comments from periodicals and newspapers would of themselves make a large volume. It is deeply regretted that the limitations of this memorial do not permit the inclusion of all of the many editorial tributes which a generous press paid to Colonel Gaillard at the time of his death. A few of these comments that appeared in the technical and weekly press and in the daily press, have been selected as representing the warm response from the whole country.

TECHNICAL AND WEEKLY PRESS

(*Army and Navy Journal* Dec. 13, 1913.)

Lieut.-Col. David DuBose Gaillard, Corps of Engineers, U. S. A., whose death in Baltimore, Md., December 5, 1913, we briefly noted in our last issue, was an officer who stood exceedingly high in his profession. He is the first of the army engineers employed in the construction of the Panama Canal to die as a result of his work, which is considered as undoubtedly a contributory cause of his illness, although the results of the official autopsy made pub-

lic on December 8th indicate that the immediate cause of death was an infiltrating tumor in the brain. . . .

Colonel Gaillard had the digging of Culebra Cut, without doubt the greatest and most difficult work connected with the construction of the canal. Colonel Gaillard's work at Culebra, it is estimated, saved the Government \$17,000,000.

Colonel Gaillard was in New York last spring on a leave in the hope that the rest would benefit his health to the extent that he would be able to remain in the Canal Zone to see his part of the work completed. He sailed from New York on June 26 last, again to take charge of the work in the Central Division. He had to return North, however, a couple of months later, and entered the Johns Hopkins Hospital at Baltimore, where he had been a patient since August 17. The weight of responsibility, coupled with the climatic conditions and the long hours of physical work had undermined his health.

Last month a bill was introduced in Congress to promote Colonel Gaillard to the rank of colonel for his distinguished service. He lay unconscious at the hospital at the time and knew nothing of the wedding of the Atlantic and Pacific, with the blasting of the Gamboa Dike on October 10.

At the Panama Canal 20,000 workers on the Culebra section were to interrupt their work and stand at attention for five minutes on December 8, at the time of the funeral of Colonel Gaillard, who was chief engineer of this section of the canal. The Senate passed a resolution expressing sympathy, and Secretary of War Garrison sent a telegram of

condolence to Mrs. Gaillard as soon as he learned of her husband's death.

[Professional Memoirs, Corps of Engineers, United States Army and Engineer Department at Large, January-February, 1914, pp. 133-4.]

LIEUT.-COL. DAVID DuBOSE GAILLARD

(The article, after giving an interesting account of Colonel Gaillard's life, with detailed references to his engineering and military service, concludes):

The foregoing brief record of Colonel Gaillard's professional services speaks eloquently for his talents and ability. In his more than twenty-nine years of continuous active service, he has filled positions of great responsibility and trust, covering a wide and varied field of duty, both as a military and as a civil engineer. His successful prosecution of the monumental work on the Culebra Cut of the Panama Canal, one of the greatest and most trying of engineering problems, constitutes a crowning achievement in a life characterized by conscientiousness, loyalty and modesty.

His friends and intimates will remember Colonel Gaillard, not only for professional attainments of the highest order, but also for his character as a man, husband and father. Possessed of a cheerful temperament and of a never-failing good humor, he was always a welcome addition to any gathering. A life so well spent must indeed serve as an inspiration to coming generations.

HALBERT P. GILLET
Editor-in-Chief of *Engineering and Contracting*
(In an Editorial, Dec. 10, 1913)

DAVID DuBOSE GAILLARD, AUTHOR

The death of David DuBose Gaillard will cause much to be said about his construction work as an engineer. His fidelity to the task of directing the largest single excavation that man has yet carved through a mountain—the Culebra Cut—has cost him his life. This tragic end will merit all the public notice that it will receive.

Before Gaillard went to Panama he performed a great work which is unknown to the general public, and of which few engineers have knowledge. He had made a most painstaking series of tests and had written an exhaustive treatise that was published nine years ago as Professional Paper No. 31 of the Corps of Engineers, U. S. A., entitled “Wave Action in Relation to Engineering Structures.” At the time of its publication the writer was one of the editors of *Engineering News*, and it fell to his lot to condense “Paper No. 31” into an article. But to abstract such a paper was not the task of a few hours, nor even of a few days. The paper was of absorbing interest to the writer, not because this was on a subject of which he knew much, but because of its authorship. Here was an author who has undertaken to present to the engineering world not merely a mass of data—although that alone would have merited its reward—but who had undertaken to analyze the data and derive useful generalization therefrom. This was noteworthy authorship, and the deeper the writer studied the paper the more its merit impressed him. Three solid

weeks were spent in the study of Gaillard's treatise, and in condensing it into an article, which was then submitted to the author for review. His letter of reply was full compensation for all the work that the article represented.

Any careful student of Professional Paper No. 31 could scarcely fail to see therein a picture of the man who wrote it. The picture is one of a highly trained, analytical man of science, gifted with a great thoroughness of application to the problem in hand.

The picture is not that of a man of "pure science," either, of one who delves for facts merely for the pleasure of finding what is new. The picture is of the scientific man who seeks facts with the object of their immediate, useful application. It is the picture of an engineer. That it is the picture of a great engineer there was no doubt in the writer's mind nine years ago, and time has merely served to bring into more pronounced relief the greatness of the man.

CHARLES WHITING BAKER

Editor-in-Chief of *Engineering News*

(In a letter to the *New York Times*, Dec. 22, 1913)

To the Editor of The New York Times:

Your editorial article, commenting on the achievements of the late Col. D. DuB. Gaillard in the Panama Canal work and urging suitable recognition by Congress, deserves commendation. It is probably little realized by the general public how many millions of dollars have been saved to the United States by the quality of the service that has been rendered by our engineers who have conducted the work at Panama.

Colonel Gaillard was distinguished among his as-

sociates by the enthusiasm with which he worked. No college football captain trains his team with a more eager zest than Colonel Gaillard displayed in the conduct of his huge task—the largest job of excavation by far that the world has ever seen. And let me summarize in a word the results: The rock of the Culebra Cut has been blasted, excavated, loaded on cars, hauled some fourteen miles and spread on the dump. The work has been carried on 2,000 miles from the base of supplies, with a plant bought at the boom prices of 1907, with skilled labor receiving the highest wages ever known, with inefficient colored labor of the tropics to perform the ordinary tasks, with the heat and rains of a tropical climate, to say nothing of constantly recurring slides and floods. Under all those conditions, the cost per cubic yard of the Culebra Cut excavation has been only some two-thirds the cost of the rock excavation on the Chicago Drainage Canal, built in the '90's, where the rock was merely dumped in a pile on the bank beside the canal.

I sincerely trust that Congress will suitably recognize Colonel Gaillard's service, not alone because such recognition is peculiarly deserved where a man yields up his life in his country's service, but because such recognition is necessary to counteract the oft-repeated charge that republics are ungrateful. Such devoted public service as Colonel Gaillard gave is needed everywhere; and the country can well afford to deal generously with those who give their lives in such service.

(*Engineering Record*, New York, Dec. 13, 1913)

DEATH OF COLONEL GAILLARD

The death of Lieut.-Col. David DuB. Gaillard in Baltimore last week marks the first break in the ranks of those great engineers to whom the Panama achievement is to be credited. Not less bravely than the soldier whose career ends on the battlefield did he give up his life in the service of his country. With the other men still fighting the engineering battles on the Isthmus, his name will go down in history, for the Panama Canal will assume important rank in American annals.

(*Engineering News*, New York, Dec. 11, 1913)

It is greatly to be regretted that a man who contributed so much to the success of this great enterprise, for which he truly gave his life, should not have lived to witness its completion, or at least to have died with the knowledge that every detail gave proof of ultimate success.

This is particularly the case because of all those occupying positions of high responsibility in connection with the great work at Panama, Gaillard will by common consent be awarded chief place for enthusiastic interest in the work. Many, if not most engineers, as they advance in years, become so accustomed to the routine of professional work that they follow it from force of habit and lose the interest in it that animated them in the years when life was new. But Colonel Gaillard was a man who possessed in rare degree the quality of youthful enthusiasm, a quality that made him most attractive as a friend and as a co-worker.

From one point of view, his task was one of the least spectacular on the Isthmus, even though in point of dollars spent and material moved it was the hugest of all. The great feat that he accomplished in this task was not the battling with slides or the design of the plant and equipment. It is expressed in the statement that this huge piece of excavation, the largest ever undertaken in the world, beset by many great difficulties, all tending to make the work unduly expensive, has been carried out at a cost per cubic yard removed which has seldom been even approached in work carried on anywhere in the world under the most favorable conditions.

(Railway and Engineering Review, Chicago, Ill., Dec. 13, 1913)

DEATH OF LIEUTENANT COLONEL GAILLARD

Lieut.-Col. David DuBose Gaillard, United States Army, who directed the engineering work in the Culebra Cut, a division of the Panama Canal, died at Johns Hopkins Hospital in Baltimore, Wednesday, December 5. . . . His ability as a supervising officer and as an engineer has been commended in the highest terms, and much regret is expressed at the occurrence of his death just at the time of the completion of his monumental task.

(Steam Shovel and Dredge, New York, Dec., 1913)

The death of the distinguished engineer will cause a pang of sorrow in the hearts of the hundreds of men who worked under him on the Panama Canal, for he was greatly respected and admired by all who came in contact with him. . . .

No soldier ever won fame in a more deserving way than did Colonel Gaillard. His deeds were not

of the heroic kind on the field of battle, but they were none the less valuable to the world, and his place is secure in the history of the country. . . .

As a man, Colonel Gaillard was kind-hearted and always took a keen interest in the welfare of the common laborers. To him the common laborer was just as important as the highly skilled mechanic, for he was interested in seeing that justice was done to all. That is why his death will be mourned in the canal zone.

VAUGHAN CORNISH

(In *Geographical Journal* of the Royal Geographical Society,
London, Feb., 1914)

In 1908, on my second visit to the Panama Canal works, I found Colonel Gaillard installed as engineer in charge of the Culebra Cut. Thanks to his organization, everything worked smoothly and rapidly, and the neatly terraced sides of the cut stood firmly. But when I next visited the canal in 1910, the bottom of the cut was already upheaving. Consequently, during the last four years of his life he thought and labored unceasingly upon an excavation of which the sides would not stand up, and a construction of which the foundation sank. He was an active, alert and vigorous man, in the prime of life. His intelligence was above the common and his mind worked quickly. His great personal charm gave him many friends, and he had that wide range of intellectual interest which is so useful to a man burdened by an arduous task. But at last the strain broke him. Such a work as the dividing of a continent requires the sacrifice of men as well as money and Gaillard spent himself willingly in the execution of his task.

(*Collier's Weekly*, Jan. 3, 1914)

David DuBose Gaillard, hero of the great Culebra Cut, was buried the other day in Arlington, dead at fifty-four. In energy and efficiency, in loyalty and honor, he was a true son of that new South which has risen from the ashes of our Civil War. In constructive genius he was a peer of De Lesseps and the other great engineers of the French stock. Our statesmen and millionaires shrink and fade most pitifully when we set their performances against the modest devotion to duty which was this man's life.

(*The Outlook*, Dec. 20, 1913)

GAILLARD: SOLDIER OF PEACE

Something like twenty-five years ago a young journalist by the name of Rudyard Kipling made a prophecy. "Some day," he said (we quote from memory), "the American Army will make the finest engineering corps in the world." The American Army is today a great deal more than a fine engineering corps, but no one will deny that this prophecy of Mr. Kipling has been justified by the facts. Engineers of the American Army owe the high position which they hold today not chiefly to their skill in planning means of scientific destruction, but to their constructive achievements in the realm of peace. Not the least among these leaders of the new army was Lieutenant-Colonel Gaillard, now dead on the field of battle. The war in which he was engaged was not with man, but for man, and with forces of Nature. Since 1907 he had been in charge of the central division of the Panama Canal,

concerned with the stupendous operations at the Culebra Cut, that nine-mile artificial valley which we have made through the backbone of the Isthmus.

(*Nation*, New York, Dec. 11, 1913)

The death of Colonel Gaillard, the conquerer of Culebra Cut, comes pathetically close upon the completion of the historic task. In a very real sense he gave his life to his work. Unremitting toil broke his health, and one likes to imagine that it was only a brave spirit which held him on the Isthmus till the work in hand was done. That task was carried on in the manner of the true workman, outside of the glare of publicity and with thought only for the matter in hand. Had Colonel Gaillard lived a few months, the *Nation* would have undoubtedly expressed its recognition of his services.

(*The Human Factor*, New York, March, 1914)

The engineers of the American Army owe the high position which they hold today not so much to their skill in planning means of destroying life as to their constructive achievements in the realm of peace.

Among the most successful of these was the late Lieut.-Col. D. D. Gaillard—one of the heroic figures in the great historic achievement of severing the continents at Panama. . . .

He served his country and humanity with heroic fidelity, and gave up his life on the altar of patriotism, fighting not *with* man, but *for* man in conquering the forces of nature.

DAILY PRESS

(Atlanta, Ga., *Constitution*, Dec. 10, 1913)

The change in world trade and the vast era of development that will follow the opening of the canal will be attributable as much to the energy and the sacrifice of such men as Gaillard as to the enterprise and wealth of the American people. When it is said that this labor was the most gigantic of those labors of Hercules which have characterized the construction of the waterway, the achievement of Colonel Gaillard is seen in its proper proportion.

(Baltimore *American*, Dec. 6, 1913)

Lieut.-Col. David DuBose Gaillard, the man whose practical genius contributed so much toward building the canal, an engineer of the highest type, besides being a man of the worthiest ideals and noblest aspirations, has left behind him a name whose luster will be none the less because he died upon the brink of the full achievement of the task to which he devoted his life. The man who breathed his last in Baltimore, the city destined to have a new era as a result of his enterprise, will be remembered forever by his fellow countrymen and his name will stand for the best traditions of army service and of patriotic carrying on of a herculean undertaking. So that despite the pathetic incidents of his closed career, it is one that will be a heritage to his family and to the nation.

(Baltimore *News*, Dec. 31, 1913)

A MONUMENT TO GAILLARD

James Bryce says that in the construction of the Panama Canal man has taken more liberties with Na-

ture than in any other instance in history. The Culebra Cut in particular has appealed powerfully to the popular imagination. In a recent article by the editor of *Engineering News* the statement is made that this work is the "largest job of excavation by far that the world has ever seen."

It appears, also, that not only is it the most colossal undertaking of its kind but it has been carried out with remarkable economy and efficiency. It had to be done "2000 miles from the base of supplies, with a plant bought at the boom prices that prevailed in 1907, with skilled labor receiving the highest wages ever known, with the heat and rains of a tropical climate, to say nothing of constantly recurring floods and slides"; but, in spite of all the disadvantages, the cost per cubic yard of excavating Culebra Cut was only two-thirds the cost of rock excavation for the Chicago drainage canal.

And the man who, more than any other, did it was Gaillard, the pathetic circumstances of whose death have touched the nation's heart. There is something particularly appropriate in the suggestion that a monument to him be erected on one of the hills overlooking the cut, where it would stand permanently as evidence that republics are not ungrateful.

(Battle Creek, Mich., *News*, Dec. 10, 1913)

"IN SIGHT OF THE GOAL"

There is appropriate comment, both in tone and quality, upon the death of Col. David Gaillard, who built the Culebra Cut at Panama, and wrecked his health, and died while his triumph was about to be celebrated.

And it is being said that it is too bad that he could

not have lasted until he saw the realization of his hopes—and too bad, too, that he wore his life out, there, in the accomplishment that took his very self before it would yield.

Neither of these things is too bad, when you come to think of it.

Colonel Gaillard was not working Culebra Cut for the sight and sound of the hurraing millions who would celebrate the final completion of the work. He was working there because it was his work, and his reward was in the knowledge that his papers showed him from day to day, that a good day's work was being done.

And as to wearing his life out—why, after all, it was only a matter of a few years, anyhow—“and whoso would save his life must lose it.” This latter is written in a higher authority, even, than the engineering rules by which they chart canals.

Colonel Gaillard didn't wear his life out, as a matter of fact, nor does any man wear his life out who does conscientiously a thing which is his to do.

Colonel Gaillard built his life into that marvel of the ages by which the mountain range of the Isthmus was separated and the oceans joined.

Perhaps there is something pathetic in the fact that he died “in sight of the goal,” but perhaps it was just as well. For he knew, at least, that the goal had not been missed.

(Beaumont, Tex., *Journal*, Dec. 10, 1913)

IN HONOR OF A HERO OF PEACE

Col. David DuBose Gaillard, Corps of Engineers, U. S. A., and member of the Isthmian Canal Commission, has passed away.

From the nature of his ailment since his return to this country last August, a fatal ending was expected by those closely acquainted with the circumstances, and still his demise at Baltimore has cast a gloom over that host which knew him best at the big ditch.

For seven long years this modest individual labored most heroically on the most difficult task in the construction of the Panama Canal. For seven long years he stood at his post amidst all the unhealthy environment and the discouraging beginnings of that work up to almost its very end, undismayed by the repeated slides which might have daunted a less confident and resourceful man.

As the sun descended the western horizon night after night this man would hope against hope that the dawn of the next day would not show the work of the day before undone, but still he resumed his labor with irresistible progress and in the end saw the great undertaking nearing completion within the time promised, but like the seer of old, was not allowed to behold its fulfillment.

On the very day on which his completed work was given to the world, he lay unconscious and without hope of recovery, and it is one of the inscrutable decrees of fate that he should not have been spared to witness the culmination of the great undertaking in which he bore so notable a part.

Let the nation shed a tear at the grave of this hero of peace.

(*Boston Globe*, Dec. 8, 1913)

SACRIFICED HIS LIFE

Fate, seemingly unkind, decreed that Lieutenant-Colonel Gaillard should not live to participate in the

final triumphs of American engineering skill on the Isthmus of Panama.

The faithful servant is dead.

The guns will thunder and the bands will play in time to come as the ships of many nations pass in procession from the Atlantic to the Pacific, formally celebrating the marriage of the oceans, but he will not be there to witness and enjoy the spectacle.

Literally it is true that he sacrificed his life for his country. . . .

We suggest that Culebra Cut might well be re-christened Gaillard Cut to perpetuate the name and the fame of the man who dug it.

(*The Buffalo Enquirer*, Dec. 14, 1913)

The country has had no martyr of exactly the Gaillard kind before. "Culebra" means nothing to this country. It is a name that can be spared. "Gaillard" means much. It should be placed where the country will ever keep it in mind. What better place than on the mighty, continent-cleaving cleft he dug?

(Cedar Rapids, Ia., *Gazette*, Dec. 10, 1913)

A HERO WORTH REMEMBERING

The late Colonel Gaillard, who died in Baltimore last week, has been widely eulogized. And certainly few Americans have deserved such encomiums as have been tendered this man—after he has passed away.

For seven years as member of the Canal Commission and Colonel of Engineers, Gaillard labored heroically on the Culebra Cut. To him had been assigned the most difficult task in the construction of

the Panama Canal, nothing less than cutting a water path through the backbone of the American continent. Undismayed by the repeated slides that might have daunted a less confident and resourceful man he kept steadily at the task, never sure that dawn would not show the work of the day before undone, but resuming his irresistible progress that in the end completed the great undertaking within the time promised. To his professional efficiency he added a patriotic purpose of economical administration. Most of the time he was without a chief assistant and personally supervised details as well as directing the general organization. It has been estimated that he saved \$17,000,000 on the cost of the central division of the canal.

(*Chicago Tribune*, Aug. 21, 1913)

GAILLARD OF CULEBRA: A MAN WHO DESERVES WELL OF HIS COUNTRY

If he had held a city against desperate siege for month after month, he would have been called "the hero of ———," every school boy would know his name, and a thrill would have run through the nation when the report of his physical breakdown appeared in large headlines in the press.

But David DuBose Gaillard has been engaged in a task more difficult, perhaps, and as important to his country, and he has paid the penalty of his grim resolution, his duty and his enthusiasm, and now lies perilously ill in Johns Hopkins Hospital just as his splendid service is nearing its completion. Lieutenant-Colonel Gaillard is the man of the Culebra Cut. It is he who, day by day, has directed and personally led the fight against the treacherous slides,

mastered their strategy and won the fight for the canal.

For months Colonel Gaillard's strength has been yielding, it is reported, to the strain, yet he has worked 12 hours a day much of the time in the staggering heat of the cut. Finally Nature demanded her fee, and Gaillard of Culebra fell like a commander on the field of victory. Whether he will survive or whether he will be restored to health cannot now be predicted. But no man who ever laid down his life on a field for the republic better deserves its gratitude and the memory of his countrymen than David DuBose Gaillard, conqueror of Culebra.

(*Chicago Tribune*, Dec. 7, 1913)

GAILLARD OF CULEBRA

No man who fell, sword in hand, under the flag, died for his country more gallantly than David DuBose Gaillard, the conqueror of Culebra. He gave himself without stint while he lived, and he laid his life on the altar—"the last full measure of devotion."

"Gaillard dug indomitably," says the dispatch announcing his death. "Hill after hill found its angle of repose, and he checked the landslides, save at Cucaracha and points nearby. Their sliding was persistent, but had visibly weakened when the engineer was compelled to stop his work and seek rest.

"For the greater period of his work on the Isthmus, Colonel Gaillard was without a chief assistant. He wanted to save money. He gave his attention not only to the great engineering problems but to all the details of shovel work, train work, and drain-

age. He checked up on small things, and once it was computed that by his careful oversight he had saved the Government \$17,000,000.

“Men who worked with him said he gave twelve hours of each day to the Culebra Cut. In addition he had a voice in all matters pertaining to engineering work in the Zone, to civil administration, and to the general conduct of affairs.

“The hard work, the nervous strain, the worry, and the tropical climate combined broke his health at the hour of his final triumph. There was little left then to be done but to remove the soft earth of the slide at Cucaracha.”

Congress should honor the memory of David Gaillard in some substantial way. It owes it to Gaillard, to the Army, and to the American people.

(*Chicago Evening Post*, April 30, 1915)

GAILLARD CUT

President Wilson has signed an executive order changing the name of Culebra Cut in the Panama Canal to “Gaillard Cut” in honor of the late Col. David D. Gaillard, who died from disease contracted in the building of the canal.

The *Post* was one of the first newspapers in the United States to suggest this tribute to as gallant a soldier, as fine an engineer, as splendid a gentleman as ever graced the roll of the United States Army.

Gaillard was one of the knights of the old Round Table, transferred from the chivalrous age of Launcelot and Guinevere to the practical age of concrete mixers and steam dredges. It seems strange but the qualities of Launcelot’s day had as free play in the jungle-ridden paths of Panama as they had in

the court of King Arthur. In both it was the relation between man and man that counted. Here Gaillard was knightliness itself.

From a technical standpoint, the work of Gaillard was that of one of the four greatest men that the canal has produced. How great his work was, indeed, will probably not be known till the final verdict of history is passed upon the mighty job of joining the two oceans.

To the country "Gaillard Cut" will stand as a memorial to an unselfish soldier and a great engineer. To his friends it will be a monument to a gallant knight. In both cases it is fitting and appropriate.

(Cleveland, Ohio, *Leader*, Dec. 14, 1913)

The suggestion is made by the *Boston Globe* that the name Culebra Cut be abandoned and this most difficult part of the Panama Canal be officially rechristened "Gaillard Cut."

The reasons for this are so obvious and potent that it seems almost impossible the idea will not be adopted. The cutting of Culebra mountain was the greatest feat accomplished in the stupendous canal undertaking. By many competent engineers the object sought was considered impossible of fulfillment. Lieutenant-Colonel Gaillard accomplished the task successfully. But the task killed him.

Literally, Lieutenant-Colonel Gaillard gave up his life for the success of the Culebra Cut and for the Panama Canal. Just as truly he gave up his life for his country. The people of the United States owe it to themselves to afford him a monument which will stand for all time an impressive object lesson of

American devotion and achievement. And what nobler, more enduring or more fitting monument could be selected to bear his name than the great cleft with which he split a continent?

(*The Record*, Columbia, S. C., Dec. 6, 1913)

AN EPIC AND ITS HERO

It looks like the irony of fate that Col. David DuBose Gaillard, conqueror of Culebra Cut, should die at the moment of the culmination and triumph of his great achievement, but to the creative genius the joy in his work is the chiefest, most prized reward. The trump of fame and the acclaim of millions falling on his ears could really have added little to the pleasure and satisfaction of Colonel Gaillard on the completion of his great task. The immortal part of him, the spirit that was put into his work and the everlasting memorial it will bear of his personality and fame to all future times can never die.

Colonel Gaillard's friends and kindred will mourn without comfort or avail that he should have been snatched from them by the inexorable conqueror of all at such a moment, but, viewed from the standpoint of eternity, is it not most fitting that the crown of immortality, in every sense of the word, should have been thus placed on the brow of one to whom life could add no greater goal of success.

Pathetic, as it may be, there seems to be an artistic fitness that all the poets and creative masters have recognized and emphasized that the Tragic muse alone is worthy to crown and conclude a great epic and its heroes.

(Davenport, Iowa, *Times*, Dec. 9, 1913)

Against the treachery of nature Lieutenant-Colonel Gaillard pitted his splendid ability, abundant vitality and unswerving loyalty. It was a tremendous fight, but he carried the Culebra Cut through to completion. By engineers he will be remembered as the man who dug the Culebra Cut. By the army his memory will be treasured as that of an officer and a gentleman who embodied the efficiency and devotion to duty of the service.

Man changes the face of nature even to the extent of sundering continents and uniting the oceans. But he pays the price. Lieut.-Col. David DuBose Gaillard dug the Culebra Cut and paid for this achievement with his life.

(Frankfort, Ky., *Journal*, Dec. 10, 1913)

"GAILLARD OF CULEBRA"

Lieut-Col. David DuBose Gaillard, who died of nervous and mental collapse at Johns Hopkins University as a result of the terrific strain of seven years of successful work upon the Culebra Cut of the Panama Canal, crowned his life work with the sacrifice of his life.

When Ismail Pasha set out to build the Suez Canal by having thousands of Egyptian laborers dig in the ditch and live in unsanitary camps, the lives of countless unpaid men were sacrificed. When the French tried to dig the Panama Canal, the same thing occurred. The United States made the canal zone sanitary and the mortality rate among laborers was low. But the tremendousness of the engineering project put men like Lieutenant-Colonel Gaillard

upon their mettle and they worked unceasingly and without regard to the results to their health.

“Gaillard of Culebra” is one of the nation’s heroes. A Gaillard statute might suitably be set up at Culebra Cut, like that of the French engineer de Lesseps, which commands the entrance to the Suez.

(Hingham, Mass., *Journal*, Dec. 12, 1913)

It must always remain a source of the deepest regret to his grateful fellow-citizens that one of the three master minds of the Panama Canal should not have lived to see the completion of the great work with which his name will be forever linked. The death of Lieutenant-Colonel Gaillard is one of the few tragedies connected with that tremendous undertaking in whose successful conclusion he played so conspicuous a part, and his appreciative countrymen will not forget to keep his memory green nor fail to see that the full measure of that fame which is his due shall be accorded to him, says the *Boston Transcript*. Posterity will crown with laurel leaves his brow and history will generously record the value of his services. It may be said of this modest, unassuming and efficient officer who has added such lustre to the United States army that he cheerfully laid his life upon the altar of his country no less than if he had sacrificed it for the flag upon the battlefield. Seven years of faithful application to his duty in the tropics, years during which he solved one after another the engineering problems which arose at baffling Culebra, proved too much for his strength and health, and so he could not live to see

the opening of the great waterway which he had helped to carve from the living hills. That eight-mile cut through the continental divide, its sliding sides chained by his genius, will remain a nobler monument to his memory than the one which Congress, no doubt, some day will erect upon the Isthmus.

(*Los Angeles Tribune*, Dec. 12, 1913)

THE LATE LIEUTENANT-COLONEL GAILLARD

Through the rocky heart of the Isthmus stern the
soldier had carved a way.
Then, with triumph near and reward at hand, came
summons he must obey.
For years his duty—he never shirked—was to toil
’neath the tropic sun,
And he answered the call—death’s signal note—nor
knew of the laurels won.
Ships pushed their prows on the silver path he had
cut through barren stone,
As he set out on the longer voyage that each man
must go alone;
But flowers heaped high by loving hands were as
visible forms of prayer
That the brave rest well, and his voyage end in a
haven august and fair.

(*Meridian, Miss., Star*, Dec. 12, 1913)

DAVID DuBOSE GAILLARD

David DuBose Gaillard, the man under whose personal direction the Culebra Cut, on the Panama Canal was made, who passed away in a Baltimore hospital, last week, after months of illness, deserves a memorial as much, or more, than many to whose

memory great piles of granite have been erected in this and other lands.

Mr. Gaillard's untimely death was due to an earnest devotion to duty. He had lived and had labored, labored incessantly, in a tropical country where such labor as Gaillard performed is calculated to debilitate the strongest men. But Gaillard had a duty to perform and he performed it, performed it at the cost of his life. He staked his great abilities against a mountain and won, but he couldn't live to glory in his work.

Wouldn't it be a fine monument to such a man to erect, equip and operate a great engineering school under his name—a Gaillard School of Engineering? We hope something of this sort will be done by the national government.

(Muscatine, Iowa, *Journal*, Dec. 6, 1913)

American army officers have proven their mettle in every war and skirmish in which troops of this nation have been engaged. In later years they have been proving their efficiency and courage in peace as well as war.

No soldier more truly or more nobly gave his life in the service of his country. His mission was not to decrease the population of the world, but to so remake the topography of the world that its population might be more evenly distributed.

As the natural barriers that once kept communities and nations isolated from one another are overcome or brushed aside, there comes a more complete understanding between section and section, nation and nation, continent and continent. With every

forward step in understanding there comes an equal diminution of the causes of strife and hatred.

In this drawing together of a world no one achievement serves to rank with the building of the canal. History will deal gratefully with every great leader who contributed much to this achievement and high among these leaders will stand the name of the American soldier-engineer, who conquered Culebra at the cost of his own life.

(New Orleans, La., *Times-Democrat*, Dec. 6, 1913)

Culebra has figured so often in the newspapers that the public is more familiar with it than with any other section of the canal. The great cut posed many a wearisome problem to the canal builders and tested their mettle to the utmost. Five years of almost continuous supervision of the work there placed a heavy strain upon Colonel Gaillard. He bore the burden patiently and uncomplainingly, and led his forces to a notable engineering victory.

In tardy recognition of his service and sacrifice a bill was introduced in Congress last month promoting him to the rank of Colonel. But it was decreed that he should not live to witness the consummation of his work upon the isthmus nor to enjoy the rewards so richly deserved. Colonel Gaillard's fate was peculiarly pathetic. He gave his life to his country's service as truly as though he had fallen in battle. He gave the best that was in him without counting the personal cost. Coming home, physically broken and doomed, he had the satisfaction of knowing that the important duty assigned to him had been successfully performed, and that, to a

soldier of his ideals and noble traditions, was ample recompense.

(New York *Sun*, Dec. 6, 1913)

DAVID DuBOSE GAILLARD

It is known by all his associates that Col. David DuBose Gaillard, U. S. A., who died in Baltimore yesterday, succumbed to the strain of his indefatigable labors as engineer in charge of the Culebra Cut. The work of excavation, in which he never spared himself, killed him at the age of 54, when he had ten years to serve in the army with the prospect of attaining the highest honors in his profession.

In the Engineer Corps there was no more brilliant officer, with the possible exception of Colonel Goethals, and certainly none more self-sacrificing in the discharge of duty. He lived to complete his great work, and what an undertaking it was when he had to do almost daily battle with landslides, trenching against the enemy and laboriously turning its flank!

Colonel Gaillard never won the fame of his associates, Goethals and Gorgas, but his merits were scarcely less and his exertions and devotion fully as great.

(New York *Herald*, Dec. 14, 1913)

Men who seek to set down the names of the heroes of Panama, who have given their all to help make the canal a monument to American skill and energy for all the world to see, will place high up on the list the name of Lieut.-Col. David DuBose Gaillard,

who "broke the back of a continent," as one who observed his colossal task at Panama declared. Lieutenant-Colonel Gaillard persisted in his work in spite of failing health and gave up his life on the altar of patriotism no less than does the leader of a little band of fighting men who carries his troops across a battlefield straight in the face of the enemy and against overwhelming odds.

(New York *Tribune*, Dec. 6, 1913)

"DEAD ON THE FIELD OF HONOR"

A tribute is due to David DuBose Gaillard, who yesterday died in his very hour of triumph. Two or three other names were more widely known than his in connection with our great work at the isthmus, but none was entitled to more honor for integrity, devotion and high achievement. It was his lot to grapple with the crux of the whole engineering task, the Culebra Cut. It was the pitting of a man against a mountain, and the man won. He cleared the cut from end to end; and though since his incapacitation the treacherous slopes have sought to undo his work, he has left to his successors the secret of full triumph. The mighty gap in the Cordillera de Bando will be his monument.

The world honors great conquerors. It honors even those who conquer fellow men in contest for selfish supremacy. Much more should it honor the men who conquer hostile or obstructive forces of nature for the welfare of mankind. The man who smote asunder a mountain chain to make a highway for the commerce of the nations and perished as he won the victory is as truly as any bloodstained warrior "dead on the field of honor."

(*New York World*, Dec. 6, 1913)

While the news of the successful flooding of the waterway and the passage of the first boats through the high-level locks was being greeted with applause by millions of his countrymen, the army engineer who had pierced the backbone of the continent and whose name deserves to be linked with those of Goethals and Gorgas as the Conquerors of the Isthmus, was fated to lie in a state of unconsciousness in a hospital bed.

No soldier ever gave up his life to duty on the field of battle more truly than did Gaillard, the modest, tireless, efficient engineer.

(*New York Journal*, Dec. 7, 1913)

A HERO OF OUR TIME

A brain trouble caused by overwork in a tropical climate caused the death of Lieutenant-Colonel Gaillard, who was directly in charge of the excavation for the Panama Canal cuts. Gaillard was a direct victim of his tireless, modest zeal in the construction of the canal. A worthy lieutenant of Goethals, he was absolutely trusted in every detail that was ever put into his hands.

He was the type of man who puts genius into the turn of a shovel. He was also of the type of the heroic American soldier who, without arrogance, without pretense, and often without rest or recreation, toils all his life long for the honor of his country, and not at all for wealth.

No death in battle, no impetuous leadership of a whirling charge, could be braver or more honorable than this patient, modest South Carolinian's end.

His record of brilliant service, calmly rendered over his plan or at the excavation's side, is worthy to stand with the story of Warren, of Shaw, of Reynolds or of Lawton.

His work will endure; dead he will have the fame that never came to him alive, and that he never sought save by patient and self-forgetting diligence in his duty.

(*Philadelphia Bulletin*, Dec., 1913)

Lieutenant-Colonel Gaillard was described as one of the most wonderful organizers the United States Army ever developed. He was born at Winnsboro, S. C., in 1859, descendant of an old Huguenot family. He was graduated from West Point Military Academy in 1884 and since that time had won many honors in the engineering service. A bill was introduced in Congress last month promoting him to the rank of Colonel in recognition of his distinguished services, which culminated in the great engineering feat in the Culebra section of the Panama Canal. While Culebra Cut was flooded by the blasting of Gamboa Dike on October 10th last, Colonel Gaillard lay unconscious in his bed at the hospital.

When Gaillard reached the Canal Zone and looked over the scene of his coming labors, he found that the French had completed thirty per cent of the digging at Culebra necessary for a canal 200 feet in width. This left for the American engineer seventy per cent of the labor necessary for a 200-foot channel, and all the additional work necessary for the 300-foot channel which the Americans had decided to construct.

The Culebra Cut runs through the backbone of the

American continent. It is eight miles long, and it was the only place on the Isthmus which presented a continuous problem of dry digging. The work up to October 10th last was entirely steam-shovel work.

The army officer dug the Culebra Cut "to the bottom," but at Cucaracha and in its immediate vicinity the earth and the rocks of the mountains, finding a part of their foundation removed, began to move toward and into the excavation. The engineer dug indomitably; hill after hill found its angle of repose, save at Cucaracha and at points close to it, where the sliding was persistent.

The entire work of dry digging in the Culebra Cut was completed when Lieutenant-Colonel Gaillard was stricken and compelled to leave the Zone.

When Gaillard started his Isthmian work he knew that he must overcome the landslides which were certain to start when the mountains through which he was to make his way showed their footholds were becoming insecure. He made his way fighting. Literally, he was obliged to shackle the feet of the great hills. He did it, and engineers say that his work is for all time.

While the work which confronted Gaillard at Culebra Cut was not perhaps the greatest individual piece of engineering on the isthmus, it generally was regarded as the most trying and probably the most difficult because of the problems which were presented. Gaillard, during the early years of his contest with the landslides, never knew what a morning was to bring forth. Over night the mountains were likely to break loose and to cover with their deposit the tracks and even the cars which were used

to remove deposited material. Steam shovels were likely to be overturned, and there was always the danger in the rainy season that the slides would form dams, cut off the drainage of the cut and flood the scene of the working.

For the greater period of his work on the isthmus, Lieutenant-Colonel Gaillard was without a chief assistant whose duty it would have been to look after the details. The army officer wanted to save money, if possible. He gave his attention not only to the greater engineering problems which confronted him, but to all the details of shovel work, train work, and drainage. He checked up on the small things, and it is said that the saving which he accomplished by his individual and careful oversight amounted to \$17,000,000.

Men on the isthmus say that Gaillard, as a rule, gave twelve hours of each day to the work in Culebra Cut. As a member of the Canal Commission he had a voice in all matters pertaining to the engineering work in the Zone, to civil administration and in the general conduct of affairs. It has been said of him that he did not know how to rest.

(Portland, Ore., *Journal*, Dec. 11, 1913)

To his memory there can be paid the tribute due those who serve their country well.

Culebra Cut will be his monument. Several mountains will commemorate his fidelity to duty.

(The Springfield, Mass., *Daily Republican*, Dec. 6, 1913)

Colonel Gaillard's death is so clearly the result of his unremitting toil at the Isthmus that one is

disposed to rank him very high among "the heroes of peace." His monument for all time will be that tremendous excavation through the mountain backbone of the isthmus.

(St. Louis *Globe-Democrat*, Dec. 6, 1913)

The death of Lieut.-Col. David DuBose Gaillard in Johns Hopkins Hospital will cause sorrow throughout the country, although it was not unexpected. Ever since he was driven away from his work on the Panama Canal by Secretary Garrison of the War Department, owing to his physical and mental condition, there has been little expectation of the recovery of his powers, giant* that he was. He became a nervous wreck while battling with the slides in the Culebra Cut, disasters that for a time threatened the success of the greatest engineering enterprise of modern times, if not of all history.

According to the statement of his grief-stricken wife, he worked night and day on plans for overcoming the slides. Plan after plan he devised and tried in vain. He worked into the small hours on new plans and arose while it was yet night to personally superintend their application. The loss of sleep and the incessant worry showed their effect and his friends futilely tried to induce him to take a rest. He stubbornly persevered until he mastered the problem and left only after peremptory orders were given by the secretary of war. While the country was celebrating the final blast in the great work the hero who had for seven years poured out his

*Though possessed of marvelous energy and vitality, he was slender in build. Sibert was "the giant" of the twain. See pp. 13-14.

life for its success lay unconscious in the hospital. He did not know of the praise lavished upon him. He was not aware that a bill had been introduced in Congress to make him a colonel as a tribute to his efficiency and loyalty.

(*St. Louis Republic*, Aug. 18, 1913)

AT GAILLARD'S BEDSIDE

Lieut.-Col. David DuBose Gaillard has returned from Panama broken in health. It will be months, physicians say, before he will be able to resume his duties. For seven years he has been in charge of the central division of the canal work, the division that includes the Culebra Cut. Everybody knows about Culebra Cut, but comparatively few know about Gaillard. And while at first glance that may not seem quite fair, we guess, after all, it is as it should be. Certainly the spirit of self-effacement that has characterized the men who have directed the digging of the canal is one of the fine things about that great work. Into that work they have poured their lives with a valor and loyalty and fidelity that would add luster to the annals of any age. "Peace hath her victories no less renowned than war," and, therefore, it has its battles which call for the same stern, steadfast qualities that win immortality on the field of blood. The shattered Gaillard has filed an account against posterity, but we of his own day would be delinquent if we did not pause at the bedside of this officer and gentleman and splendid American to wish him a speedy recovery.

THE SLEEPER AT ARLINGTON

Gaillard sleeps at Arlington, and for a moment there is a pause in the acclaim of the success at Panama. For a moment "the tumult and the shouting dies," and it is given us to think, not about the Isthmian miracle, but of the labor of the men who wrought it.

Gaillard was chosen to dig the Culebra Cut. He had prepared himself for this supreme task by a life of study. Throughout his career this officer and gentleman had been an indefatigable worker. In various parts of the country there are lasting memorials to the service he has rendered his Government. Even before Panama his name, in military circles, had become a sort of tradition. He was the man for the job that could not be done but had to be done. And so he came to the Isthmus.

Since his death we have had glimpses of days under an equatorial sun followed by nights over blue prints. The long rations of toil and the short rations of rest finally saw the slides of Culebra brought to check. They also saw the end of Gaillard. The faithful brain and sturdy body broke under the remorseless drive—but not until the impossible had been accomplished, not until the Gaillard tradition was a thing for admiration and reverence.

This son of South Carolina who sleeps at Arlington lives in history, one of that gallant company best fitted to survive.

Brig.-Gen. E. J. Spencer, John A. Laird, and other officers of the Third Regiment, Volunteer Engineers, which Lieut.-Col. David DuBose Gaillard mustered here at Jefferson Barracks during the Spanish War, are preparing to prosecute a movement to erect a monument to the "wizard of Culebra Cut" somewhere along that giant masterpiece of engineering achievement.

The idea was broached recently in an editorial in *The Republic* which called attention to the appropriateness of such a testimonial by the American people to the canal builder on the site of his greatest work.

Colonel Gaillard probably nowhere is remembered more intimately or affectionately than in St. Louis, which saw his entry into the really big period of his life when, in July, 1898, he came to St. Louis as a Captain in the regular Army of the United States to recruit and command a regiment of engineers for service in Cuba, or wherever necessary. He was known in St. Louis and to prominent St. Louisans as a great man long before his master work at the canal had demonstrated to the world his unequalled ability and efficiency.

As his greater triumphs were to come in times of peace, so did Colonel Gaillard's earlier successes elicit attention and commendation as those of a constructive, rather than a destructive, agency. His engineers were ordered to Cuba after the fighting was over and he and his engineers, men of high standing in their own country and of exceptional ability, landed in a territory devastated by roving

bands of insurgents, of depredating Spanish troops and of pioneering American forces.

His was the duty to repair, reconstruct and construct out of this wreck of war a groundwork for the newer life that was to follow in the wake of oppression and ruin.

When Colonel Gaillard's engineers reached Cienfuegos the death rate was 138 a week. When they left it, six weeks later with its sanitation system completed, the week's mortality had dwindled to twenty-nine. The city had been thoroughly surveyed, water supply investigated, artesian wells bored, natural water falls studied as water supply, 800 miles of roads reconnoitered and mapped, complete military reconnoissance map of Cienfuegos and vicinity completed, complete reports on conditions and capabilities of railroads of the province, reports in improvements of different barracks in province with estimates, supervision of repairs, warehouse construction, bridge repairs, wharf and dock repairs, and a hydrographic survey of Cienfuegos Harbor with 2,600 soundings.

"We knew him for a great man long before the rest of the world came to recognize him to be such," said one of these who served as a lieutenant under him. "We saw in his wonderful faculty of command over men, his ability to whip the rawest kind of a recruit into a disciplined, efficient soldier and his remarkable genius for constructive engineering work and scope of application the manifestations of a master mind and we confidently looked forward to the day when he would meet some task too big for the other fellow to do—and do it.

"I visited Culebra Cut with him, and when I

looked at that amazing and awe-inspiring achievement of this quiet and determined man I knew that the qualities we all knew so well he possessed at last had found a field worthy of them.

“He worked and thought always of the canal and the cut with its treacherous slides that were enough almost to wring surrender from any heart less stanch than his own, but he never gave up and his work triumphed in the end.”

(*St. Louis Republic*, Dec. 15, 1914)

A MONUMENT AT CULEBRA

The Republic's suggestion that a monument be erected to Lieutenant-Colonel Gaillard on the site of Culebra Cut has met with response from many St. Louisans who, as members of the Third Regiment, Volunteer Engineers, in the Spanish-American War, were under the command of the then Captain Gaillard. That was an exceptional regiment which was mustered in at Jefferson Barracks, both as to officers and as to men. But it was especially exceptional as regards its commanding officer, David DuBose Gaillard. His genius for leadership and tireless passion for perfection in every detail making for regimental efficiency impressed officers and men alike. While yet Culebra Cut was a pestilential tropic growth and the Canal was a matter of discussion at Washington and Bogota, those men who knew Gaillard knew that here was real greatness awaiting only an opportunity.

They believed in him supremely. They saw him make finished soldiers of untrained men. They saw a volunteer camp, under his exacting patience, attain

to regular army standards of sanitation, routine and discipline. They saw him later drive filth and death and disorder out of Santa Clara Province. Some years afterwards they saw him at the head of an engineering corps on the Mississippi River, still the same calm, achieving force, doing, as always, the things to be done.

Finally, the chance for the great thing came—the canal impossibility, the unconquerable Culebra Cut. That is history now, and there is another grave at Arlington. But to the men of the Third who knew Gaillard it is prophecy fulfilled and faith vindicated.

It is easy to understand why they want to see a monument at Culebra Cut and why they want to take a part in the building of it. For those men “the man is dead, but Gaillard is not dead.”

(*Washington Times*, Dec. 6, 1913)

Culebra Cut is a reality, probably for centuries, at least, but the man who made it such is no more.

We have been making sacrifices in Panama in life as well as treasure, even if what we have given up as the price of that vast undertaking is far less than the appalling losses of the French. And the most conspicuous sacrifice yet yielded is Lieutenant-Colonel Gaillard.

Men marveled that Gaillard could seem to set the laws of nature at naught in his concentration on the task of removing the tremendous mass of earth that filled the space occupied by what is now Culebra Cut. He worked harder in a climate that demanded a lessening of strain than he would have worked

normally in the stimulating atmosphere of the United States. He showed mercy to his subordinates but none to himself. And he has paid the price.

(*Washington Times*, Dec. 19, 1913)

The name of Gaillard possesses a charm for those who watched the parting of a strip of earth that the Panama Canal might take its place among the wonders of the world. He was the man in charge of the Culebra Cut section of this great project, undertaken by one nation, but affecting every nation with ships upon the seas. . . . His death came while the echoes of this accomplishment echoed round the world, and when the gates are opened eventually to all the ships that care to enter, his figure will be missing among the list of wonder workers who will receive the plaudits of civilized mankind.

(*Wilmington, Del., Journal*, Dec. 12, 1913)

Lieut.-Col. David DuBose Gaillard, United States engineer, met death as a result of storming the ramparts of nature and disease in the great work of building the Panama Canal. Knowing the danger, he kept his face turned resolutely toward it, fighting tirelessly and intelligently until stricken down. The canal has developed many heroes and the name of Colonel Gaillard will be placed well up toward the top of the list.

**CONTEMPORARY VIEW OF COLONEL
GAILLARD UPON HIS APPOINT-
MENT TO THE ISTHMIAN
CANAL COMMISSION
IN 1907**

CONTEMPORARY VIEW OF COLONEL GAILLARD UPON HIS APPOINTMENT TO THE ISTHMIAN CANAL COMMISSION IN 1907

The *New York Times*, under date of April 28, 1907, in an article on "The Men Who Will Build the Panama Canal," gives the following sketch of Colonel Gaillard:

Major David DuBose Gaillard, the second engineer in charge, is a native of South Carolina. He is the youngest looking of the three. But Major Gaillard's career has been exceedingly varied. In fact scarcely any officer in the army has had as varied an experience or has been intrusted with so many important Government commissions as Major Gaillard. And all these commissions have been of a peculiar character. He graduated at West Point in 1884, when he received his commission, but not once since that time has he been with a regiment or a battalion except during the Spanish War, when he was Colonel of an engineer regiment.

Major Gaillard is a rather slim man, and though he is forty-eight years old, or will be in September, he doesn't look to be over thirty-five. Like the other army officers, he is well preserved, though he has seen stern service. He has been very nearly everywhere that an army officer is ever sent, either in peace or in war, except to the Philippine Islands.

His career has been a more picturesque one, perhaps, than either of the other two engineers. He has been engaged on many very interesting missions. He had been out of West Point but a few

years, having been a teacher in the Engineer School of Application and an assistant on the St. John's River jetties and other river and harbor work in Florida, when he was appointed in 1891 by the President one of the three Commissioners to make the boundary line between Mexico and the United States from El Paso, Texas, to the Pacific Ocean. Major Gaillard, then Lieutenant Gaillard, had many interesting and romantic experiences while engaged in this work—riding horseback five or six hundred miles on the stretch, camping in the desert with one or two companions, and getting on familiar terms with jackrabbits, coyotes, and Mexicans. When he completed this work he was personally complimented in a State paper by the Secretary of State. Then he was ordered on duty in the construction of fortifications and a sea wall at Fort Monroe.

One of the most valuable works on which Major Gaillard has been engaged is the Washington Aqueduct, though his connection with it and the valuable work which he did are appreciated by only a few, because, as said above, army engineers are accustomed to doing things without press agents or brass bands. He was but a First Lieutenant when he was put in sole charge of this work, and it was he who had charge of constructing the Great Falls dam and of cleaning out, for the first time since its construction, the conduit.

He went from Washington to Alaska upon an important secret work of the Government, the exact nature of which does not appear in the army orders, and is not generally known, even among Major Gaillard's most intimate friends, because it had some relation with the international complications

between this country and England. Nominally, and as the order reads, he was sent there upon work on the Portland Channel. After the completion of this work, for which he was highly complimented by the Secretary of War, he was put on the staff of Gen. Wade, and served at Tampa and at Chickamauga. During the war with Spain, Major Gaillard recruited and organized the Third United States Volunteer Engineers and became Colonel of that regiment, remaining so until the regiment was mustered out in 1899. His regiment was sent to Cuba just at the close of the war, and he was placed in charge of the Department of Santa Clara, Cuba.

Among the most important, though perhaps less spectacular, sanitary works done in Cuba were those done under the direction of Major Gaillard. He took charge of the sanitary work in Cienfuegos, Matanzas, and other cities of Cuba. The work which he did there stands as a monument to the efficiency and the strength of the man, as well as to the credit of the country. Many columns have been written about how General Leonard Wood cleaned up Havana. Very little has been said about how Major Gaillard cleaned up Cienfuegos and Matanzas. General Wood was Colonel of the Rough Riders, which, as the world knows, had a very efficient corps of press agents. The Third Engineers had no press agent, but it had a man at the head of it, and this man was educated and trained in the regular army, and was not accustomed to press agents or the blowing of the horn to announce to the world what he had done. No reflection is meant upon General Wood. Perhaps Major Gaillard should have had a press agent.

Some very important as well as dramatic work was done by the Third Regiment under Colonel Gaillard. It was chosen by Gen. James H. Wilson to disarm at midnight and place under arrest the members of the Sixth Virginia Colored Volunteer Infantry at Macon, Georgia, in 1898. The negro troops were mutinous and on the rampage generally, and proposed to shoot up the town of Macon, somewhat similar in manner to the way the troops of the Twenty-Fifth Infantry shot up Brownsville. Colonel Gaillard took his regiment out at midnight, surrounded the negro regiment, and took their guns away from them, put the whole regiment under arrest, and kept it there for thirty days without arms of any description. The negro regiment was then mustered out of service. Senator Foraker being engaged on something else at that particular time did not ring the fire alarm, and very little was heard about it, but it was done, and Major Gaillard was the man who did it.

After his volunteer regiment was mustered out Major Gaillard was again assigned to the Washington Aqueduct, but was soon appointed Assistant Engineer Commissioner of the District of Columbia. He was placed in entire charge of the Water, Sewer, and Building Departments. In 1901 he was ordered to Duluth and placed in charge of all river and harbor improvements on Lake Superior. Here, it is worthy of mention, he completed the largest dredging contract ever let by the United States Government, taking out over twenty-one million cubic yards.

Major Gaillard is also one of the closest students in the army, and one of the most scholarly. For

years he devoted his attention to the subject of wave action. The results of his studies were a few years ago published by the Government as one of the "professional papers of the Corps of Engineers" under the title of "Wave Action." This work attracted wide attention. Engineers throughout many countries of the world have written letters to him about it. He also prepared a number of papers for various engineering societies, and is one of the foremost authorities on certain phases of engineering. Before becoming a member of the General Staff years ago he was one of the professors in the War College at Washington. Thus this engineer has had all sorts of experiences. In every one of his many commissions he has acquitted himself with such signal ability, given such eminent satisfaction to the authorities which appointed him, that he is known as a man fitted for great undertakings.

NEW BOOK BY COLONEL GAILLARD

Lieut. Jos. A. Baer (Sixth Cavalry), writing in *Harper's Weekly* (issue of April 27, 1907, vol. 51, pp. 602-605), entitled his article: "Uncle Sam—Canal Digger."

Scientific books and publications too numerous to mention have been written by members of the engineer corps. One of the latest is by Major D. D. Gaillard on Wave Action in Relation to Engineering Structures. Major Gaillard is one of the engineer officers detailed as assistant to Lieutenant-Colonel Goethals in the work of completing the Panama Canal. The treatise is on an entirely new field and shows the originality and thoroughness of the author. This same originality he displayed in his work on the Duluth Harbor improvements. In the construction of his breakwater he evolved a method of moulding his concrete blocks in place underwater. A folding form to mould a block of required section was lowered into the water and filled with concrete. When this had set the form was opened, drawn up, and moved two form-lengths forward and another block moulded. The space between these two blocks was then moulded in by a second form and a continuous concrete wall thus built. From Duluth Major Gaillard went to Washington, where he served on the General Staff. . . .

Not the least important river and harbor service that the Engineer Corps has rendered the country is the work of the Engineer Board in killing unworthy improvement appropriation schemes. This and their construction work are necessarily so im-

portant in the eyes of Congress that there is danger that the true weight of the Panama Canal work may be lost sight of. The digging of the canal is a project that has baffled engineers for four centuries. It is the greatest administrative problem of the age. To succeed, the office of the chief of engineers must be free to concentrate all its energies upon this one project—everything else is secondary. Until the canal is well under way, let the army engineers alone.

THE FUNERAL

THE FUNERAL

By Stephen M. Foote, Colonel Coast Artillery Corps, U. S. A.
(Late Major, Third U. S. Volunteer Engineers)

The funeral ceremonies were held in Washington, D. C., and Arlington, Va., on December 8th, 1913, a raw and gloomy day. The body was brought from Baltimore on that date, transferred from the station to the church, and there at 2:30 p. m. was taken in charge by the military escort.

Although best known to the world as a civil engineer, Gaillard was a soldier by birth, education and instincts and it was therefore eminently fitting that the final disposition of his earthly remains should be through the impressive ceremony of a military funeral. The escort consisted of the Battalion of United States Engineers and Band from Washington Barracks. Services were held at St. John's Episcopal Church, the "Church of the Presidents," Sixteenth and H Streets. The chancel was filled with floral offerings from the President of the United States and Mrs. Wilson, Secretary of War and Mrs. Garrison, the Chief of Engineers, the Officers of the Engineer Corps in Washington, the Third U. S. Volunteer Engineers, the class of '84 at West Point, the Aqueduct Office (Washington), the Isthmian Canal Commission (Panama Office), the Isthmian Canal Commission (Washington Office), the Directors of the Panama Railroad, the

Senators from South Carolina, the Representatives from South Carolina, the Municipality of Winnsboro, S. C., besides many from personal friends.

The casket was draped in the National Flag, to which he had devoted nearly the whole of his life.

Mrs. Gaillard was attended by her son, Pierre, and other members of the family.

The President was not able to attend, but Mrs. Wilson was present in the pew immediately behind the family.

Behind the President's pew sat the Secretary of War, Hon. Lindley M. Garrison; the Assistant Secretary of War, Hon. Henry S. Breckinridge; and the Chief of Staff, Major-General Leonard Wood. Two pews were occupied by representatives of the 3d Volunteer Engineers. Colonel Eugene J. Spencer, Captain Frank L. Averill, Lieutenants Hamilton, Barney, Baumgardner, Sergeant Grove and others were present.

Mrs. Averill was there, also, and Mrs. Jadwin. Colonel Edgar Jadwin was unfortunately on duty as a witness before the United States Court in Galveston, Texas, and could not be present. Col. Henry C. Davis, Gaillard's brother-in-law, was on his way to the Philippines.

Two pews were reserved for the Class of 1884, Gaillard's class at West Point. In them sat Colonels Edwin B. Babbitt, Henry D. Styer and E. F. Ladd, Maj. D'R. Cabell, Mr. Constant E. Jones, Mr. James A. Long, Mr. M. Nibben, Mr. and Mrs. Edward B. Clark, Mrs. Harry Taylor and Mrs. Stephen M. Foote. Colonel W. L. Sibert had started a few days before on his return trip to Panama.

Two pews were reserved for the South Carolina

Congressional delegation. In them sat Senator and Mrs. Benjamin R. Tillman, Senator and Mrs. Ellison D. Smith, Mrs. Finley and Mr. David E. Finley, Jr., wife and son of Representative Finley, and Representatives Wyatt Aiken, James F. Byrnes, David E. Finley, Asbury F. Lever, Jos. T. Johnson, Richard S. Whaley and J. Willard Ragsdale.

Among others in attendance were noted Lieut. Gen. John C. Bates, retired, and Brig.-Gen. John M. Wilson, retired, and many officers of the Corps of Engineers on both the active and retired list.

The pallbearers, in full dress uniform, were the following:

Col. William M. Black, Corps of Engineers;
Col. Stephen M. Foote, Coast Artillery Corps;
Col. Edward Burr, Corps of Engineers;
Col. William C. Langfitt, Corps of Engineers;
Lieut.-Col. Harry Taylor, Corps of Engineers;
Lieut.-Col. Joseph E. Kuhn, Corps of Engineers;
Lieut.-Col. Chester Harding, Corps of Engineers;
Lieut.-Col. Edgar A. Mearns, retired, Medical Department.

The services at the church were conducted by Rev. Roland Cotton Smith, rector of St. John's; Rev. Dr. Randolph H. McKim, rector of the Church of the Epiphany; Rev. Dr. Williamson Smith, and Rev. E. S. Dunlap, assistant to the rector of St. John's.

The vested choir sang "Rock of Ages," and "Asleep in Jesus," Gaillard's favorite hymns.

The casket was placed on an artillery caisson and the cortege proceeded to beautiful Arlington, the National Cemetery.

The final words of the ritual were pronounced by Rev. E. S. Dunlap. Three volleys were fired by the

Engineer battalion and "Taps" was sounded by Chief Musician Frank J. Weber, who was band leader of Gaillard's regiment, the 3d Engineers.

The grave is on a southern slope, near the last resting place of many another soldier who gave his life in the service of his country.

(*The State*, Columbia, S. C., Dec. 14, 1913)

The four companies composing the engineer battalion stationed in Washington were drawn up at "present arms" while the casket, flag draped, was borne into the church. Only two floral pieces were placed upon it with the colors—a beautiful bunch of carnations and palm leaves which went from the White House to Baltimore—the personal token of sympathy from the wife of the president to the widow of the distinguished engineer—and a crescent from the Third United States engineers. All other flowers were placed in the church—a magnificent display, filling the entire chancel.

MRS. GAILLARD TO THE THIRD U. S. VOLUNTEER
ENGINEERS

Mrs. Gaillard, in a letter to the Third U. S. Volunteer Engineer Association, expressed her deep appreciation of the action of the Regiment in the hour of affliction.

Ridgeway, So. Ca.,
16 December, 1913.

E. M. Pirkey, Esq.,
Sec. 3rd U. S. V. Engrs.

My Dear Mr. Pirkey:

Will you, as Secretary, express to the 3rd Engineers my very deep and warm appreciation of their

sympathy in this time of sorrow, and my thanks for the magnificent crescent of red and white roses, the engineer colors, and the beautiful lilies sent to Baltimore, as tributes to my husband? These were placed on the casket, over the flag he served so well, and went with him to Arlington. Of all the offerings, I am sure none could have been more precious to him, could he have known. He loved his regiment, as it grew under his eyes to that wonderful efficiency finally attained, it filled his heart with pride and affection. When it ceased to exist, he felt something gone out of his life, until in the reunions he realized that though officially mustered out, they were still bound together by ties of affection and trust, ties only developed when men have been thrown together as men and have stood shoulder to shoulder. Of all his achievements, not even excepting Culebra Cut, there was none in which he felt greater pride than in the Regiment of 3rd Engineers and their wonderful record. They tell me that it was Mr. Weber, our band leader, who sounded taps over the grave. I am pleased that it was one who loved him, who sounded for him and for me, "Lights Out."

My husband was a man so modest that satisfaction of work well done was all the reward he desired, but could he have known of the spontaneous and appreciative "Well done, thou good and faithful servant," sent up by the entire country, he would have been deeply touched, and for me to feel that his sacrifice is so appreciated, must in time soften my sorrow. The country loses only the engineer, but we, his friends, lose the man, and in the emptiness he leaves behind him, and in my loneliness I shall al-

ways remember and appreciate the warm sympathy
of the dear 3rd; and it will comfort and help me, for
like him I loved it and was proud of it; and feeling
that they know this, I am,

Most faithfully yours and theirs,

KATHERINE GAILLARD.

THE GAILLARD MEMORIALS

THE GAILLARD MEMORIALS

ORDER DESIGNATING "CAMP GAILLARD"

War Department,
The Adjutant General's Office,
Washington, February 6, 1915.

From: The Adjutant General of the Army.

To: The Commanding General, Eastern Department, Governors Island, New York.

Subject: Name of new post at Culebra, Canal Zone.

Referring to your indorsement of January 16, 1915, on letter dated January 15, 1915, from the commanding officer, 29th Infantry, on the above stated subject, I am directed by the Secretary of War to inform you that the new post at Culebra, Canal Zone, is designated and will, hereafter, be known as Camp Gaillard, in honor of the late Lieut.-Col. David DuB. Gaillard, Corps of Engineers.

H. P. McCAIN.

By command of Major General Murray:

EBEN SWIFT,
Colonel, General Staff,
Chief of Staff.

"CULEBRA" RENAMED "GAILLARD CUT"

The public sentiment in favor of renaming "Culebra" in honor of Colonel Gaillard, was voiced in various resolutions, among which may be noted the following by the Chicago Association of Commerce:

The Executive Committee of the Chicago Association of Commerce, upon the initiative of the subdivi-

sion of Engineers of the Association on July 10, 1915, by unanimous vote, adopted the following resolution:

Whereas, David DuBose Gaillard, lieutenant-colonel, Corps of Engineers, United States Army, late an Isthmian Canal Commissioner in charge of the Culebra Division, died December fifth, nineteen hundred and thirteen, from disease resulting from his long and arduous service in the construction of the Panama Canal, and

Whereas, his untimely death deprived him and his family of the public honors and material rewards which he had justly earned, therefore be it

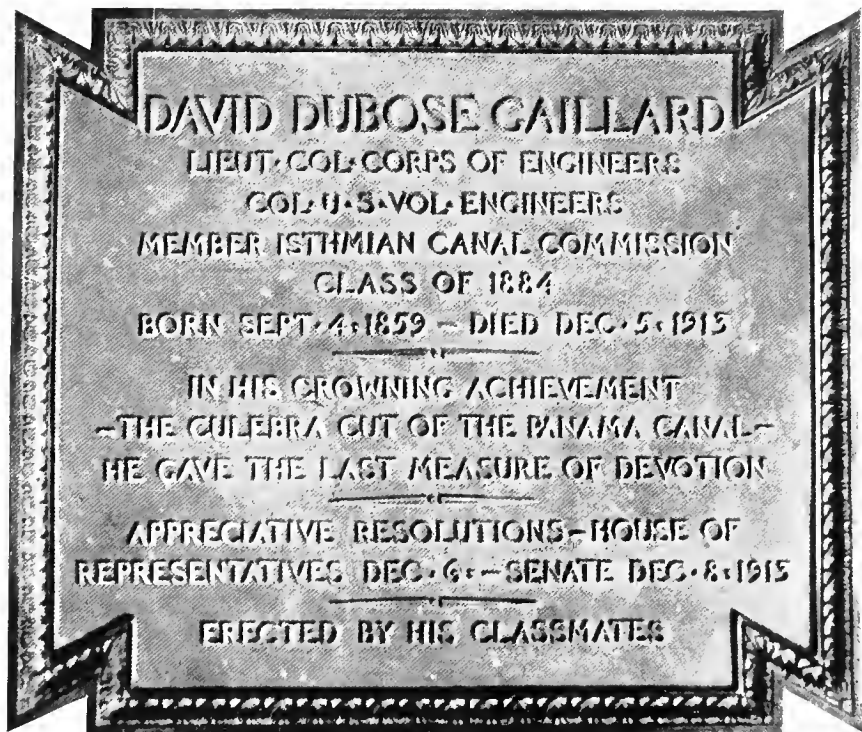
Resolved, That the Chicago Association of Commerce concur in the recommendation of the Engineers' Subdivision of the Association that the great work of David DuBose Gaillard in the service of his country should be appropriately recognized; that Culebra Cut be henceforth called the Gaillard Cut and a monument inscribed as a memorial to the service and sacrifice of Colonel Gaillard be erected on the banks of the Gaillard Cut.

EXECUTIVE ORDER

The President issued an Executive Order renaming Culebra, as follows:

It is hereby ordered that the portion of the Panama Canal through the Continental Divide heretofore known as "Culebra Cut" shall hereafter be named "Gaillard Cut" in honor of the late Lieut.-Col. D. D. Gaillard, Corps Engr. United States Army.

As a member of the Isthmian Canal Commission



Tablet erected in Cullum Hall, West Point, N. Y.

by the Class of 1884

United States Military Academy

Unveiled June 11, 1914, on the 30th anniversary of
Colonel Gaillard's graduation

from March 16, 1907, to December 5, 1913, Lieut.-Col. Gaillard was in charge of the work in Culebra Cut until its virtual completion, being compelled to abandon his duties in July, 1913, through an illness which culminated in his death on December 5, 1913. His period of Panama Canal Service included the years of most active construction work. He brought to the service trained ability of the highest class, untiring zeal, and unswerving devotion to duty.

I deem it a fitting recognition of Lieutenant-Colonel Gaillard's service to the country to re-name in his honor, the scene of his life's triumph.

(Signed) WOODROW WILSON.

The White House,
28 April, 1915.

'84 WEST POINT MEMORIAL TABLET
(From '84 Bulletin, West Point, July 1, 1914.)

The Class of 1884, United States Military Academy, at its 30th reunion at West Point in June, 1914, unveiled a memorial tablet to Colonel Gaillard.

Colonel Edwin E. Babbitt, on behalf of the Class of 1884, spoke at the unveiling as follows:

“ '84”:

We gather here today as a token of respect and admiration.

Nothing that I can say would add a tithe to the fame of the classmate whose name appears on the tablet before us. Davy, of himself, has written his name in everlasting letters in the minds of men. But with us, his classmates, even before this great work came to him, his loving personality inscribed his name upon our hearts.

Year by year, as our members dwindle, some one

of '84 will stand here as we are now and remember more the dear classmate than the great engineer.

It has always seemed to me that no matter how great the mind and personality, he who did not win the hearts, but only the minds of his associates, failed in a requisite of greatness.

Davy warmed to him the minds and hearts of all who knew him.

A few weeks ago Dick Richardson gathered together a number of the class in Washington where some spoke of Gaillard with sadness. Dick objected—"To few men," he said, "does great opportunity come; to Davy it appeared and he was equal to the task and passed over the divide in the fullness of victory. No greater could come to any man."

HUGUENOT MEMORIAL

The Huguenot Society of South Carolina and the Huguenot Church Aid Society have erected a tablet to the memory of Colonel Gaillard. This tablet is on the east wall of the interior of the old Huguenot Church in Charleston, S. C., to the right of the pulpit. In its immediate vicinity there are a number of tablets of distinguished Huguenots; among others—Lanier, Maury, Martha Washington and Gen. W. H. F. Lee.

GENERAL ORDERS NO. 31

(Here given in full; quoted in part on page 65 under "Official Actions.")

War Department,
Office of the Chief of Engineers,
Washington, December 9, 1913.
General Orders, No. 31.

To the Corps of Engineers is announced the sad intelligence of the death of Lieut.-Col. David DuB.

DAVID du BOSE GAILLARD U. S. A.
SO. CA. CULEBRA CUT PANAMA.
1859 ————— 1913.

MEMORIAL TABLET

Erected by the Huguenot Church and the Huguenot Aid Society
on the east interior wall and to the right of the pulpit
in the Huguenot Church, Charleston, S. C.

Gaillard, Corps of Engineers, which occurred at Baltimore, Md., on December 5, 1913.

Colonel Gaillard was born in South Carolina September 4, 1859. He was graduated from the United States Military Academy and promoted in the Army to second lieutenant, Corps of Engineers, June 15, 1884, and passed through all the intermediate grades to that of lieutenant-colonel, which he reached April 11, 1909.

He served with the Battalion of Engineers at Willets Point, N. Y., September 3, 1884, to April 18, 1887; as assistant to the officer in charge of river and harbor works in Florida until November, 1891; as member of the International Boundary Commission between the United States and Mexico, November, 1891, to November, 1896; assistant in local charge of defensive works at Fort Monroe, Va., February 12 to October 10, 1895; assistant in local charge of Washington Aqueduct and in charge of Washington Aqueduct and water supply of the city of Washington, D. C., October 11, 1895, to May 3, 1898, except when engaged on survey of Portland Channel, Alaska, August to November, 1896; engineer officer on the staff of Maj.-Gen. James F. Wade, United States Volunteers, May 6 to June 11, 1898. He was appointed colonel, Third Regiment, United States Volunteer Engineers, June 7, 1898, and was in command of his regiment in the United States and in Cuba from June 12, 1898, to May 17, 1899, when honorably mustered out of volunteer service.

Served as assistant in connection with the Washington Aqueduct, May 22 to September 9, 1899; as assistant to the Engineer Commissioner, District of Columbia, September 9, 1899, to March 6, 1901; in

charge of river and harbor works, with station at Duluth, Minn., March 9, 1901, to June 6, 1903; on special duty in connection with the General Staff Corps, at Vancouver Barracks, Wash., June 9, 1903, to January 11, 1904; a member of the General Staff Corps, August 15, 1903, to May 18, 1904; as Chief of Staff, Department of the Columbia, October 13, 1903, to January 9, 1904; assistant to the Chief of Staff of the Northern Division, January 15 to October 31, 1904; on special duty at Headquarters of the Northern Division, November 1-13, 1904; under instruction at the Army War College, November 14, 1904, to March, 1905. Member of the General Staff Corps, March 23, 1905, to March 22, 1907; assistant to the Chief of Staff of the Expedition to Cuba, September 29, 1906, to February 21, 1907. Member of the Isthmian Canal Commission March 22, 1907. Supervisory engineer in charge of dredging in the harbors, of building the necessary breakwaters, and of all excavations in the canal prism, except that incidental to lock and dam construction, April, 1907, to June, 1908; Division Engineer, Central Division (including Culebra Cut), Isthmian Canal, July, 1908, to the date of his death.

On December 6, 1913, the House of Representatives of the United States adopted the following resolution:

“Resolved, That the House of Representatives has heard with profound sorrow of the death of Lieut.-Col. David DuBose Gaillard, for whose conspicuous and valuable services in connection with the construction of the Panama Canal the Nation is indebted.

“Resolved, That the Clerk of the House transmit a copy of these resolutions to the family of the deceased.”

On December 8, 1913, the Senate of the United States adopted the following resolution:

“Resolved, That the Senate of the United States has heard with profound sorrow of the death of Lieut.-Col. David DuBose Gaillard, to whom the American people are under lasting obligations for the splendid service he rendered in overcoming some of the most perplexing difficulties in connection with the construction of the Panama Canal.

“Resolved, That in further testimonial of our esteem the Secretary of the Senate be authorized to forward a copy of these resolutions to the family of Lieutenant-Colonel Gaillard.”

Colonel Gaillard was the author of Professional Papers No. 31, Corps of Engineers, “Wave Action in Relation to Engineering Structures.”

As a tribute to his memory the officers of the Corps of Engineers will wear the usual badge of mourning for 30 days.

[90946—C. of E.]

By command of the Chief of Engineers:

EDW. BURR,
Colonel, Corps of Engineers.

**SOME OFFICIAL LETTERS RELATING
TO COLONEL GAILLARD'S
EARLIER WORK**

SOME OFFICIAL LETTERS RELATING TO COLONEL GAILLARD'S EARLIER WORK

THE ADJUTANT GENERAL TO THE CHIEF OF ENGINEERS

Headquarters of the Army.

7137, A. G. O. 1894.

Adjutant General's Office,
Washington, May 17, 1894.

To the Chief of Engineers, U. S. Army.

Sir: The Major-General commanding the Army directs me to acknowledge the receipt, through your reference of the 10th inst., of an interesting and valuable paper prepared by First Lieut. D. D. Gaillard, Corps of Engineers, embracing a description of the country, roads, trails, water and grass, etc., along the Mexican Boundary Line between the Rio Grande and the Pacific; with maps accompanying; and to say that the thanks of the Army are due to the Engineer Department for this valuable information.

Very respectfully,

GEO. D. RUGGLES, Adj.-Gen.

THE CHIEF OF ENGINEERS TO THE SECRETARY OF WAR

Office of the Chief of Engineers, United States Army.

Washington, D. C., Nov. 14, 1896.

Sir: I have the honor to submit the accompanying copy of letter of November 3, 1896, from Capt. D. D. Gaillard, Corps Engs., enclosing his report of results of preliminary examination of Portland Channel (Canal) Alaska.

The duty assigned Captain Gaillard has been performed in a prompt and very satisfactory manner and his unusually interesting report is submitted for such action as may be deemed proper in the judgment of the Secretary of War.

Very respectfully, your obedient servant,

W. P. CRAIGHILL,

Brig. Gen. Chief of Engs.

Hon. Daniel S. Lamont,

Secretary of War.

THE SECRETARY OF STATE TO MEMBERS OF THE U. S.
INTERNATIONAL BOUNDARY COMMISSION

Department of State.

Washington, Nov. 28, 1896.

Col. J. W. Barlow,

Col. Corps Engs. U. S. Army.

Capt. D. D. Gaillard,

Capt Corps. Engs. U. S. Army.

A. T. Mosman, Esq.,

Asst. C. G. Survey, Commissioners, etc.

Gentlemen:

I have to acknowledge the receipt of your letter of the 25th ult. submitting your final report touching the survey and re-marking of the boundary line between the United States and Mexico, pursuant to the Convention of July 29, '82, and subsequently revised, and continued to Oct. 11, 1896.

I wish to convey to you an expression of the Department's thanks for the manner in which you have discharged the onerous and delicate duties confided to you, and its appreciation of the character and intelligence of the report.

I shall at the proper time lay it before the President and take his direction in regard to its submission to Congress at its approaching session. I shall notify the Secretary of War that the final report having been submitted, Colonel Barlow and Captain Gaillard are released from further service under the Department of State, except when it comes to reading the proof of the report the Department may desire to avail itself of their services in order that its technical character may be competently and accurately proof read.

I am, gentlemen,

Your obedient servant,

(Signed) RICHARD OLNEY.

THE SECRETARY OF STATE TO THE SECRETARY OF WAR

Department of State.

Washington, Nov. 28, 1896.

The Honorable,

The Secretary of War.

Sir: I have the honor to say that Col. I. W. Barlow and Capt. D. D. Gaillard, Corps of Engineers, U. S. A., who were detailed by your department for service under this Department in connection with the survey and re-marking of the boundary line between the United States and Mexico, pursuant to the Convention of July 29, 1882, as subsequently revised and continued to October 11, 1896, have submitted with their colleague, Mr. A. T. Mosman of the U. S. C. G. Survey, their final report. . . .

It is a pleasure to say that these officers have not only discharged their important and delicate duties

with high ability, care and fidelity, but that they earned the thanks of this Department, which are hereby tendered, and which I trust you will appropriately make known to them.

I have the honor to be, Sir,

Your obedient servant,

(Signed) RICHARD OLNEY.

LETTERS FROM THE SECRETARY OF STATE AND THE
SECRETARY OF WAR TO THE CHIEF OF ENGINEERS

War Department, Office of the Secretary, Washington
Dec. 7, 1896.

Sir: I take pleasure in transmitting herewith, copy of a letter just received from Secretary of State, acknowledging the receipt of a copy of your report on the preliminary examination of Portland Channel (Canal) Alaska and expressing his satisfaction with the manner in which the work was performed.

Very respectfully,

(Signed) DANIEL S. LAMONT,

Secretary of War.

Gen. W. P. Craighill,
Chief of Engineers.

Department of State, Washington.

Dec. 4, 1896.

The Honorable The Secretary of War.

Sir: I have to acknowledge with thanks the receipt of your letter of the 2nd inst., transmitting for the information of this Department, a copy of a report of Capt. D. D. Gaillard, Corps Engs. U. S. A., showing the results of a preliminary examination

of Portland Channel (Canal), Alaska. The Department is much pleased that the work has been so well and so intelligently accomplished.

I have the honor to be, Sir,

Your obedient servant,

(Signed) RICHARD OLNEY.

LIEUT.-COL. JOHN BIDDLE TO LIEUT.-COL. EDGAR JADWIN

Headquarters 3rd Battalion.

Matanzas, Cuba, Jan. 2, 1899.

To Lieut.-Col. Edgar Jadwin,

3rd Battalion 3rd U. S. Volunteer Engineers.

Sir: The Commanding General of the Spanish forces at Matanzas has requested me to express on the part of the Lieutenant-General Commanding Spanish forces in Cuba, and on the part of the officers under his command at Matanzas their thanks and appreciation for the consideration and soldierly conduct shown them by the officers and men under your orders on the occasion of taking possession of this city by the United States forces on Jan. 1, 1899.

I desire also to state that the conduct of the Battalion, since its arrival here and under somewhat difficult conditions, has been in my opinion exemplary and worthy of the reputation for discipline and efficiency already attained by the 3rd U. S. V. Engineers.

Very respectfully,

(Signed) JOHN BIDDLE,

Lieut.-Col. Chief Engs. 1st Army Corps.

LETTER FROM GEN. JOHN H. WILSON, CHIEF OF
ENGINEERS

Office Chief of Engineers, United States Army,
Washington, D. C.

Jan. 18, 1899.

Col. David DuB. Gaillard,
3rd Regt. U. S. Vol. Engrs.,
Camp Fornance, Macon, Georgia.

Colonel:

I have to acknowledge with thanks your courtesy in sending for the files of this office photographs of the admirable work done by your command. Such work indicates thorough organization, skill and discipline.

I congratulate you upon your regiment and I congratulate the regiment upon having so accomplished and soldierly a commanding officer.

Yours very respectfully,

(Signed) JOHN M. WILSON,
Brig.-Gen. Chief of Engrs., U. S. A.

LETTER FROM CAPT. WALTER B. BARKER

Office of Depot Quartermaster, Cienfuegos, Cuba.

Cuba, Apr. 13, '99.

Col. D. D. Gaillard,
Commanding 3rd Reg. U. S. V. Engrs.,
Cienfuegos, Cuba.

Celonel:

It is due and I take great pleasure in saying to you that with an experience of over eight months as Depot Quartermaster, and in charge of Ocean and R. R. Transportation, your command has limited the accustomed requests and demands on my Depart-

ment to a minimum, while on the other hand it has rendered me continual material assistance.

In common with all who are familiar with the efficiency of your regiment I regret that the Government is to lose its service.

With a grateful remembrance of your consideration to me personally as well as officially, believe me,

Your friend,

WALTER B. BARKER,

Capt. & A. Q. M. U. S. Vols. Depot Quartermaster in
Charge Ocean & R. R. Trans., Captain of the Port.

LETTER FROM CAPT. F. W. WOODRING

Office of Quartermaster, Detention Camp, Daufuski
Island, S. C.

May 4, 1899.

Colonel Gaillard,

Comdg. 3rd U. S. V. Engrs.,

Atlanta, Georgia.

Sir: I take occasion to write and inform you that your regiment left its camp in the cleanest and best condition of any regiment that has been detained on the Island of Daufuski.

I also wish to state that there was less confusion and delay in breaking camp and loading on to the river boats preparatory to moving than any other regiment. I know that this report will be gratifying to you.

Respectfully, your obedient servant,

(Signed) F. W. WOODRING,

Capt. A. Q. M., Asst. Depot Q. M.

LETTER FROM LIEUT.-GEN. ADNA R. CHAFFEE

Office of the Chief of Staff, Washington.

January 17, 1905.

Major David DuB. Gaillard,

Corps of Engineers,

Washington, D. C.

Sir: In order that your record at the War Department may fully set forth your attainments as an officer in special lines, I take occasion to thank you for your services while on a confidential mission for the War Department during the past year.

The Chief of the Second Division, General Staff, remarks as follows:

“The records of the division show that Major David DuB. Gaillard, Corps of Engineers, while on a confidential mission, displayed energy, discretion and ability in carrying out his instructions.”

The Military Secretary has been instructed to file with your efficiency record a copy of this communication.

Very respectfully,

(Signed) ADNA R. CHAFFEE,
Lieut.-General, Chief of Staff.

CHRONOLOGY AND BIBLIOGRAPHY

CHRONOLOGY OF DAVID DuBOSE GAIL- LARD

Sept. 4, 1859.	Born at Fulton, Sumter County, S. C.
July 1, 1880, to June 15, 1884.	U. S. Military Academy, West Point, N. Y.
June 15, 1884.	Graduated from U. S. Military Academy.
June 15, 1884.	Commissioned 2nd Lieutenant of Engineers.
Sept. 30, 1884, to April 18, 1887.	Engineer School of Application, Willets Point, N. Y. On duty with Battalion of Engineers.
April 18, 1887.	Graduated from Engineer School of Application, Willets Point, N. Y.
April 9, 1887, to Nov. 6, 1891.	Assistant to the officer in charge of the river and harbor improvements in Florida, with station at Jacksonville and St. Augustine.
Oct. 6, 1887.	Married to Katherine Ross Davis of Columbia, S. C., at Winnsboro, S. C.

Oct. 22, 1887.	Commissioned 1st Lieutenant of Engineers.
Sept. 30, 1891, to Nov. 28, 1896.	Member of the International Boundary Commission, for the survey and the re-marking of the boundary between the United States and Mexico, west of the Rio Grande.
Feb. 14, 1895, to Oct. 10, 1895.	In local charge of defensive works at Fort Monroe, Va.
Oct. 25, 1895.	Commissioned Captain of Engineers.
Oct. 11, 1895, to Dec. 20, 1895.	Assistant, in local charge of Washington Aqueduct.
Dec. 20, 1895, to May 3, 1898.	In charge of Washington Aqueduct, and of works for increasing water supply of Washington, D. C.
Aug. 17, 1896, to Nov. 13, 1896.	Survey of Portland Channel (Canal), Alaska.
June 10, 1898.	Engineer officer on the Staff of Maj.-Gen. Jas. F. Wade, United States Volunteers, at Tampa, Fla., and Chickamauga, Tenn.
June 7, 1898.	Commissioned Colonel, Third Regiment United States Volunteer Engineers.
June 11, 1898, to May 17, 1899.	In command of Third Regiment of United States Volunteer Engineers at Jefferson

	Barracks, Mo., Lexington, Ky., Macon and Atlanta, Ga., in the United States, and at Matanzas, Cienfuegos, and Pinar del Rio, in Cuba.
Feb. 10, 1899, to April 5, 1899.	Chief Engineer, Department of Santa Clara, Cuba.
May 17, 1899.	Honorably mustered out of service with Regiment, at Fort MacPherson, Ga.
May 22, 1899, to July 21, 1899.	Served as assistant in connection with Washington Aqueduct and increasing water supply of Washington, D. C.
July 21, 1899, to March 6, 1901.	Assistant to Engineer Commissioner, District of Columbia.
March 9, 1901, to June 6, 1903.	In charge of river and harbor improvements on Lake Superior, with station at Duluth, Minn.
June 6, 1903, to August 15, 1903.	On special duty at Headquarters, Department of the Columbia, Vancouver Barracks, Wash.
Aug. 15, 1903, to May 18, 1904.	Member of General Staff Corps.
Aug. 15, 1903, to Oct. 15, 1903.	Asst. to Chief of Staff, Department of the Columbia, Vancouver Barracks, Wash.
Oct. 15, 1903, to Jan. 9, 1904.	Chief of Staff, Department of the Columbia, Vancouver Barracks, Wash.

Jan. 15, 1904, to May 18, 1904.	Asst. to Chief of Staff, Northern Division, Saint Louis, Mo.
March 25, 1904, to Oct. 15, 1904.	Engineer officer, Northern Division, Saint Louis, Mo. (Staff of Maj. Gen. J. C. Bates.)
April 23, 1904.	Commissioned Major of Engineers.
Nov. 1, 1904, to Nov. 13, 1904.	Special duty, Headquarters of the Northern Division, Saint Louis, Mo.
Nov. 14, 1904, to March 23, 1905.	Under instruction at Army War College, Washington, D. C.
March 23, 1905, to March 22, 1907.	Member General Staff Corps.
March 23, 1905, to Oct. 6, 1906.	On duty with General Staff Corps, Washington, D. C.
Oct. 6, 1906, to Feb. 21, 1907.	Asst. to Chief of Staff, Expedition to Cuba, Chief of Military Information Division, Army of Cuban Pacification, Marianao, Cuba.
March 22, 1907.	Member of the Isthmian Canal Commission. Director of the Panama Railroad.
April 1, 1907, to June 30, 1908.	Supervisory Engineer, in charge of dredging harbors, of building breakwaters, and of all excavation in the canal prism, except that incidental to lock and dam construction.

July 1, 1908, to Dec. 5, 1913.	Division Engineer, Central Division—Gatun to Pedro Mi- guel, including Culebra (now Gaillard) Cut.
April 11, 1909.	Commissioned Lieutenant-Col- onel of Engineers.
July 26, 1913.	Stricken with illness at Cule- bra, which proved fatal.
Aug. 14, 1913.	Arrived in the United States from Panama.
Dec. 5, 1913.	Died at Johns Hopkins Hos- pital, Baltimore, Md.
Dec. 8, 1913.	Buried in Arlington National Cemetery, Arlington, Va.

BOOKS, ARTICLES AND REPORTS BY DAVID DuBOSE GAILLARD

REPORTS CONTAINED IN ANNUAL REPORTS OF THE CHIEF OF ENGINEERS—ALSO SPECIAL REPORTS.

Year	Vol.	Page	Subject	Date
1888	2	1144 to 1151	Survey of Saint Augustine Harbor, Fla.	11/12/87
1888	2	1104 to 1106	Improvement of Pease River, Fla.	5/2/88
1889	2	1317 to 1323	Cost of stability of jetties of various cross-sections, and force of breaking waves. Sub't'd to Board of Engineers on improving St. Augustine Harbor.	11/20/88
1889	2	1354 to 1355	Examination of Homosassa River, Fla.	1/11/89
1889	2	1356 to 1357	Examination of Crystal River, Fla.	1/12/89
1889	2	1361 to 1364	Examination of Ocklawaha River, Fla.	1/25/89
1890	2	1571 to 1577	Construction of groins, proportions, strength and cost of concrete and wave action in works for improving St. Augustine Harbor, Fla.	6/30/90
1891	3	1632 to 1639	On wave action at St. Augustine, Fla.	6/12/91
1896	6	3905 to 3941	Washington Aqueduct and increasing water supply of Washington, D. C.	7/17/96
1897	6	3991 to 4023	Maintenance and repair of Washington Aqueduct and increasing the water supply of Washington, D. C.	7/17/97
1897	4	3487 to 3498	Preliminary examination of Portland Channel (Canal), Southeast Alaska.	11/3/96
1898	6	3642 to 3650	Filtration of Water Supply of the District of Columbia.	1/19/98

Year	Vol.	Page	Subject	Date
1898	1	in 2 parts	Report of Boundary Commission upon survey and re-marking of the boundary between the U. S. and Mexico west of the Rio Grande, 1891-1896.	Published at Government Printing Office in 1898.
1899-1900			Report of Operations of the Engineer Department of the District of Columbia for year ending June 30, 1900, pp. 13-21. Report to Engineer Commissioner District of Columbia by Assistant in charge.	8/1/00
1899			Catalogue of maps, plans, etc., deposited in the office of Chief of Engineers U. S. Army, by Col. David DuB. Gaillard, 3rd U. S. Vol. Engineers, now on file in Army War College, Washington, D. C. (Published in Third U. S. Vol. Engineers' Year Book, 1903, pp. 65-100.)	
1900	8	5126 to 5192	Report of Board of Officers of the Corps of Engineers and of Architects to consider certain designs which had been submitted for a memorial bridge across the Potomac River, Washington to Arlington. (Published as House Doc. No. 578, 56th Cong., 1st Sess.) (Col. Gaillard was a member of this board.)	3/28/00
1901	1	71 to 73	Digest of the services of Colonel Gaillard in connection with the Spanish War, April, 1898, to May, 1899. (Also other services rendered by Third U. S. Vol. Engineers, pp. 59, 90-91.)	10/1/01
1901	4	2821 to 2906	Improvement of rivers and harbors on Lake Superior.	7/13/01
1902	3	2001 to 2042	Improvement of rivers and harbors on Lake Superior.	7/20/02
Part				
1903	2	1791 to 1831	Improvement of rivers and harbors on Lake Superior.	7/18/03
• (Appendix K K)				
1903	1	464 to 475	Improvement of rivers and harbors on Lake Superior.	7/18/03

Year	Subject	Date
1904	Professional Papers No. 31 Corps Engineers. Wave Action in Relation to Engineering Structures. Supt. of Documents Government Printing Office.	
1905	Effect of wave action at certain harbors on Lake Michigan. Letter . . . transmitting . . . report of effect of wave action as affecting harbors at Ludington, Mich., and Manitowoc, Two Rivers, Racine, Kenosha and Sheboygan, Wis. (Washington Govt. Printing Office, 1905; 59th Cong. 1st Sess. House Doc. 62.)	7/15/05
1906	Report of examination and survey of Duluth Harbor, Minn. Report signed by Chas. E. L. B. Davis, D. D. Gaillard, W. V. Judson and A. MacKenzie. (Washington Govt. Printing Office, 1906, 13 p. 23 cm., 59th Cong. 2nd Sess. House Doc. 82.)	9/5/06

REPORTS CONTAINED IN ANNUAL REPORTS OF ISTHMIAN CANAL COMMISSION

Report as Chief of Department of Excavation and Dredging, Isthmian Canal Commission in Annual Report for the year ending June 30th, 1907 (U. S. 60th Congress, 1st session, 1907-8, Senate documents, Vol. 10), Appendix A., pp. 39-53.

Report as Chief of Department of Excavation and Dredging, Isthmian Canal Commission, in Annual Report for the year ending June 30th, 1908 (U. S. 60th Congress, 2nd session, 1907-8, House documents, Volume 38), Appendix A, pp. 35-55.

Report as Division Engineer in charge of Central Division, Isthmian Canal Commission, in Annual Report for the year ending, June 30th, 1909 (U. S. 61st Congress, 2nd session, 1909-10, House documents, Volume 33), Appendix C, pp. 37-90.

Report as Division Engineer in charge of Central Division, Isthmian Canal Commission, in Annual Report for the year ending June 30th, 1910 (U. S. 61st Congress, 3rd session, 1910-11, House documents, Volume 22), Appendix D, pp. 137-160.

Report as Division Engineer in charge of Central Division, Isthmian Canal Commission, in Annual Report for the year ending June 30th, 1911 (U. S. 62nd Congress, 2nd session, 1911-12, House documents, volume 30), Appendix C, pp. 133-156.

Report as Division Engineer in charge of Central Division, Isthmian Canal Commission, in Annual Report for the year ending June 30, 1912 (U. S. 62nd Congress, 3rd session, 1912-13, House documents, Volume 31), Appendix C, pp. 143-170.

Report as Division Engineer in charge of Central Division, Isthmian Canal Commission, in Annual Report for the year ending June 30, 1913 (U. S. 63rd Congress, 2nd session, 1913-1914, House documents, Volume 28), Appendix C, pp. 139-160.

GENERAL ARTICLES

“Tidal Rise and Fall in Artesian Well, Fort Marion, Saint Augustine, Florida,” prepared for the Saint Augustine (Fla.) Society for the Advancement of Science, October, 1889.

“Notes and Sketch of Petrograph and Prehistoric System of Fortification encountered along line of Boundary Survey, United States and Mexico,” Bureau of Ethnology, August, 1893.

“The Papago of Arizona and Sonora,” in the *American Anthropologist*, Washington, July, 1894, pp. 293-296.

“A Gigantic Earthwork in New Mexico,” in *American Anthropologist*, Washington, September, 1896, pp. 293-6.

“The Perils and Wonders of the True Desert,” in the *Cosmopolitan*, N. Y., October, 1896, pp. 592-605.

“The Washington Aqueduct and Cabin John Bridge,” in the *National Geographic Magazine*, Washington, December, 1897, pp. 338-344.

“Harbors on Lake Superior, particularly Duluth-Superior Harbor,” in “The Transactions of the American Society of Civil Engineers,” Vol. 54, Part A, being the first volume of the publications of the International Engineering Congress held under the auspices of the Society, St. Louis, Mo., Oct. 3 to Oct. 18, 1904 (pp. 262-296), Paper No. 13.

“Culebra Cut and the Problem of the Slides,” in *Scientific American*, N. Y., Nov. 9, 1912, p. 388.

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